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No. 2

MORE SEA DUTY FOR NAVAL OFFICERS.

Secretary Moody has begun in earnest preparations for carrying into effect his intention to reduce the number of naval officers on shore duty. While he believes that a certain amount of shore service is necessary to the proper professional education of an officer, he is convinced that every man holding a commission in the navy should spend most of his time at sea, and the indications are that shore details hereafter will come seldom and be of very short duration except among high-ranking officers for whom sea commands cannot be provided. To help him carry out this policy the secretary has prepared a circular letter, a copy of which will be addressed to every naval officer on duty in Washington and at every navy yard and naval station with the object of ascertaining the sentiment of the personnel of the service in regard to the necessity of keeping officers ashore. In this letter Mr. Moody asks each officer a number of questions. One of these is whether the officer addressed cannot conveniently perform the duties to which he has been assigned in combination with the duties performed by some other officer or officers at the same place, without detriment to the service or danger of being overworked. Mr. Moody is apparently of the opinion that it does not require nearly so many officers to do the work now being done at the various shore stations. He asks also whether a civilian could not just as well perform the duties as the officer addressed. A great many answers to this question will be in the negative, as many officers ashore are performing duties which require ability of a high character and professional knowledge that comes of experience in naval work. Another question is likely to prove a poser to many officers. Mr. Moody asks each officer ashore if he does not think that the interests of the service require that he should go to sea. This is a matter which probably can be decided by most officers only after an examination of conscience, but the secretary has sufficient confidence in the sense of duty prevailing in the service to believe that, generally, it will be answered honestly and unselfishly. The old system of placing officers on waiting orders with reduced pay when there is no work for them to do at sea or on shore, will be revived probably when Mr. Moody carries his new policy into effect. This will apply principally to officers who have reached command rank, as nearly all the junior officers can be provided for on ships in commission. In the English and some of the other navies shore details are seldom given junior officers, and to this is largely due the fact that officers of the great naval powers seldom marry until they are well along in life. Most American navy officers marry early, but whether there will be a change in this regard when Mr. Moody puts his plans into operation remains to be seen.

PROBABLY TWENTY-FIVE MILLIONS OF ORE.

An output of 25,000,000 gross tons of ore from the Lake Superior region in the present year is now quite probable. Representatives of conservative interests in the ore trade look for a restriction in the present heavy movement when docks become even more crowded than they are at present and have placed their figures at about twenty-three rather than twenty-five millions, but the general effort since the opening of navigation has been to ship every ton that it is possible to get out of the mines, and if this policy is continued the twenty-five-million record will be reached. The shipments to July 1 aggregate 8,899,833 tons (gross), against 4,963,608 tons to the same date a year ago, or a gain of practically 4,000,000 tons.

Indications as to the future of the iron and steel industry in all branches seem to justify the ore interests in working the mines to their fullest capacity. Recent purchases of steel rails by the Pennsylvania Railroad Co. (207,000 tons) bring the total of new business in rails for 1903 up to about 1,000,000 tons, besides several hundred thousand tons to be carried over from 1902. Orders from all the roads that are making purchases for 1903 show increases over requirements for the present year. There is no let-up in the demand for iron and steel manufactures of all kinds. The lake ship builders who have accepted orders for a large number of new vessels for 1903 are finding great difficulty in arranging for suitable delivery of material.

AN IMPORTANT NAVAL RULING.

In response to an inquiry from the secretary of the navy Judge Advocate General Lemly has rendered an opinion concerning the right of the president to refuse to promote naval officers who have been found by an examining board to be qualified in every way for advancement. The opinion was rendered with special reference to the case of Pay Inspector Stephen Rand, whom President Roosevelt declined to advance to the grade of pay director because he had had no sea service under his commission as an inspector. The judge advocate general holds that an officer's advancement depends on the concurrent approval of the president and the examining board and that while the president may find that an officer is mentally, morally and professionally qualified for promotion the president is invested with the power to determine whether the board's conclusions are correct. When the president disagrees with the board a concurrent approval is not secured. The main question involved in the inquiry submitted to the judge advocate general was whether the president had the right to nominate some other officer, junior to Pay Inspector Rand, to fill the vacancy which Rand would have secured if President Roosevelt had not found fault with his record. Capt. Lemly makes the point that if an officer junior to Mr. Rand were nominated to fill the existing vacancy in the grade of pay director and the senate should confirm it there would be no legal impediment to the issuance of a commission to that officer as pay director. He says, however, that the practice has been when an officer is believed by the president to be not qualified in every respect for promotion to give him another examination within a reasonable period, and not to fill the existing vacancy in the meantime. Capt. Lemly suggests that this course might be pursued with reference to Pay

Inspector Rand without injustice to any other officer in the pay corps, and that when in September the next vacancy occurs in the grade of pay director it would be possible to promote the next officer in line of advancement, Pay Inspector L. G. Boggs. The question is still open whether it would be legal for the president to keep Pay Inspector Rand in his present position as the senior officer of his grade, and continue to jump other pay inspectors over him to the grade of pay director. The naval authorities believe that this right exists, but the question will remain open until the senate reassembles in December and decides whether Pay Inspector Boggs and other pay officers shall be confirmed in the grade of pay director while Pay Inspector Rand remains stationary on the list.

ENORMOUS LAKE SUPERIOR FREIGHT MOVEMENT.

With the freight movement to and from Lake Superior through the canals at the Sault running up to nearly 5,000,000 tons a month, it is now almost certain that the 30,000,000-ton mark will be exceeded in the present season of navigation. It is wonderful to recall that ten years ago this traffic amounted to only 10,000,000 tons, and twenty years ago it was little more than 1,000,000 tons. The next congress will certainly be called upon to provide additional lock facilities in the United States canal. The total freight movement to the first of July this year, 11,486,501 tons (net), compared with 6,767,120 tons on the same date a year ago and 8,673,481 tons on the same date in 1900. Details of this traffic will be found in the following table:

MOVEMENT OF PRINCIPAL ITEMS OF FREIGHT TO AND FROM LAKE SUPERIOR.

ITEMS.	To July 1, 1902.	To July 1, 1901.	To July 1, 1900.
Coal, anthracite, net tons.....	103,167	196,823	229,052
Coal, bituminous, net tons.....	1,594,859	982,411	1,422,601
Iron ore, net tons.....	7,806,573	4,334,514	5,475,267
Wheat, bushels.....	24,398,148	9,381,344	19,145,392
Flour, barrels.....	2,625,705	1,877,341	1,854,894

REPORT OF FREIGHT AND PASSENGER TRAFFIC TO AND FROM LAKE SUPERIOR, FROM OPENING OF NAVIGATION TO JULY 1 OF EACH YEAR FOR THREE YEARS PAST.

EAST BOUND.				
ITEMS.	Designation.	To July 1, 1902.	To July 1, 1901.	To July 1, 1900.
Copper	Net tons....	35,614	24,647	42,331
Grain, other than wheat	Bushels....	3,710,093	4,479,685	4,383,774
Building stone	Net tons....	17,231	10,494	6,408
Flour	Barrels.....	2,625,705	1,877,161	1,854,784
Iron ore	Net tons....	7,806,573	4,334,514	5,475,267
Iron, pig.....	Net tons....	7,396	10,953	4,092
Lumber	M. ft. b. m.	329,625	247,772	250,968
Silver ore.....	Net tons....	.....	.....	.....
Wheat	Bushels....	24,398,148	9,381,344	19,145,392
Unclassified freight	Net tons....	22,325	9,388	15,282
Passengers.....	Number....	9,431	6,531	5,077

WEST BOUND.				
Coal, anthracite.....	Net tons....	103,167	196,823	229,052
Coal, bituminous.....	Net tons....	1,594,859	982,411	1,422,601
Flour	Barrels .....	.....	180	110
Grain.....	Bushels....	60	36,330	.....
Manufactured iron.....	Net tons....	42,454	28,959	46,901
Salt	Barrels	174,274	172,751	94,215
Unclassified freight.....	Net tons....	190,796	139,515	135,285
Passengers.....	Number	10,436	7,428	5,210

SUMMARY OF TOTAL FREIGHT MOVEMENT IN TONS.

	To July 1, 1902.	To July 1, 1901.	To July 1, 1900.
East bound freight of all kinds, net tons.....	9,529,439	5,392,954	6,825,444
West bound freight of all kinds, net tons.....	1,957,062	1,374,166	1,848,037
	11,486,501	6,767,120	8,673,481

Total number of vessel passages to July 1, 1902, was 7,753, and the registered tonnage 10,533,384.

The Bremen liner Saale, which was badly burned at the Hoboken fire a year ago, is now the freight steamer J. J. Luckenbach. She was almost entirely rebuilt by the Townsend & Downey Ship Building & Repair Co., Shooter's Island, N. Y.

TEXAS OIL FOR FUEL IN NEW YORK.

The Morse Iron Works & Dry Dock Co., Brooklyn, N. Y., is now using petroleum as fuel under its boilers. Mr. Morse, president of the company, says that the company's experience with petroleum as fuel has fulfilled all expectations.

"We have one boiler in our works using oil for fuel," Mr. Morse said, "and we shall proceed to install oil as fuel for all the other boilers in the works gradually. The second boiler to use oil will be in operation next week. The necessary changes in the furnace can be made in twenty-four hours."

"Is there offensive smell or smoke in the use of oil under the boiler?" was asked.

"There is no smell and no smoke," Mr. Morse replied. "In fact, we could do without a chimney for the boilers when oil is used as fuel. We used oil as fuel in one case for heating plates in a shop where there was no chimney to carry off smoke, and there was no smoke to carry off. There is complete consumption of the fuel in this case."

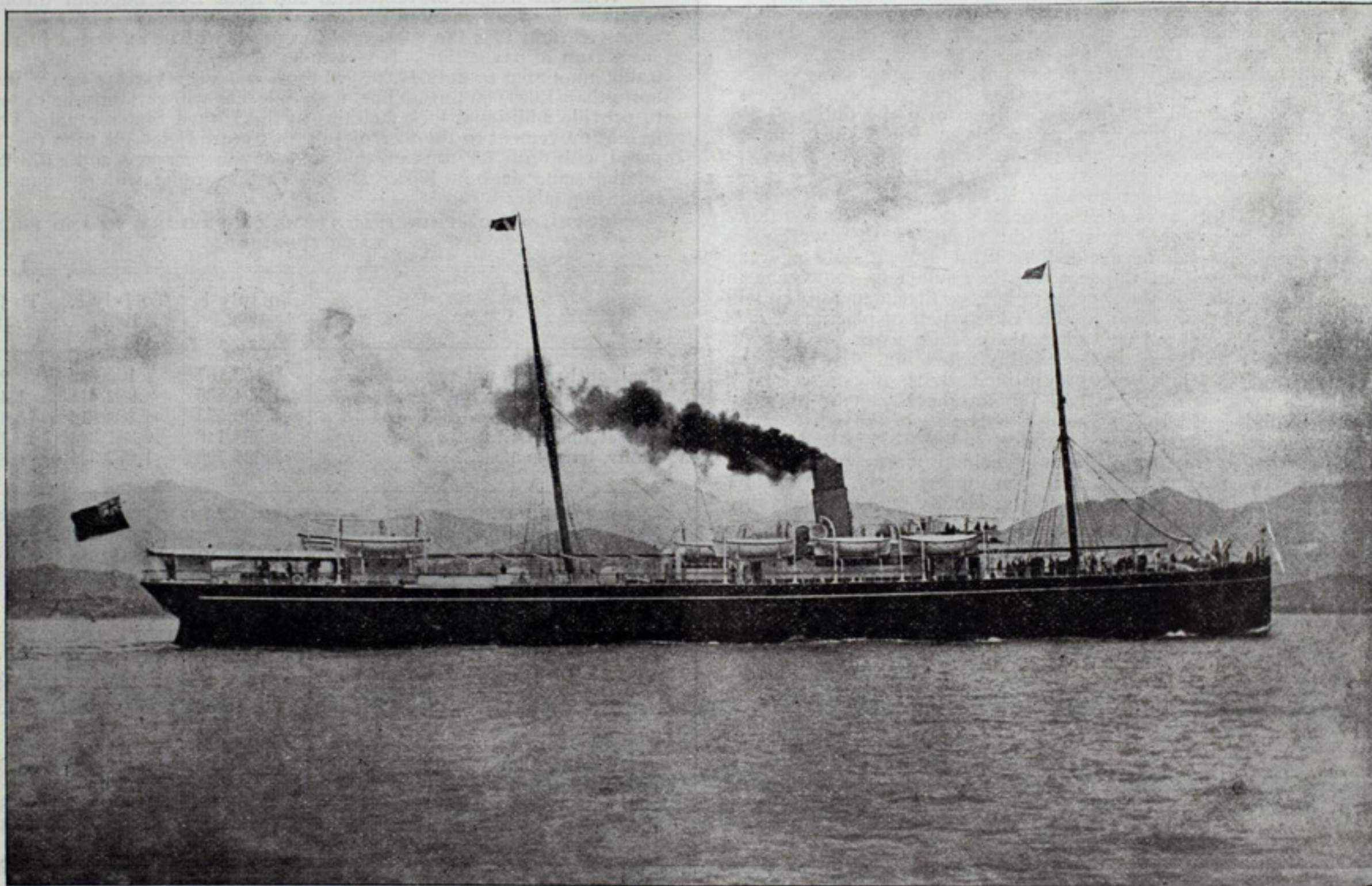
"Does oil make as effective a fuel as coal?"

"It is a better fuel than coal for steam making. With oil we can maintain a steady and uniform heat under the boiler for any required time, while the heat of a furnace fed with coal is changing constantly.

PIRRIE DOES NOT FAVOR SUBSIDIES.

A London dispatch announces that the committee of the house of commons appointed to inquire into the question of subsidies heard William Pirrie, chairman of the Harland & Wolff Co., last week. He expressed the opinion that subsidies were merely given as a bounty and served to encourage inefficiency, and that even where there could be legitimately bestowed the tendency of subsidies would be to foster individual as against general interests. Mr. Pirrie regarded foreign subsidies as a blessing in disguise, as they stimulated British ship builders to be more abreast of the times.

Replying to a question of the chairman, Mr. Pirrie said that the Morgan combination, which he preferred to call a "community of interests," was established purely for commercial purposes, and on entirely business principles. He was convinced that at the time the deal was effected a dangerous international situation was rapidly approaching, but by the creation of this community of interests the future of British ship building was assured. In short, he considered the deal to be in every way satisfactory to the British. Giving subsidies would only invite retaliation in the most important markets of the world. The extent of state assistance to German shipping was greatly exaggerated. Mr. Pirrie also said that the feeling against the combination was due to misapprehension. All



STEAMSHIP VICTORIA OF NORTHERN PACIFIC COMPANY'S FLEET—PACIFIC SERVICE.

Dodwell & Co., Ltd., General Agents, Tacoma, Wash.

It is necessary to bank coal fires when steam is not needed from a boiler, while an oil fire can be turned off and started at a minute's notice. The labor required in running oil fires is less than that required for coal fires. There is no constant shovelling. The oil is sprayed into the furnace by the action of a pump, which is regulated according to the supply needed. We have our supply tank under ground, and at a distance of about 150 ft. from the building, to comply with the city regulation, but a tank might be used in a building with safety."

"Is oil as cheap a fuel as coal?"

"It is a cheaper fuel. At present we are getting our supply of crude petroleum from the Standard Oil Co. and paying about \$1.05 a barrel for it. Even at that cost we find an advantage in the use of oil as fuel. We expect that there will be adequate supply of Texas oil here soon and that the price will be about 50 cents or 60 cents a barrel. Then the cost of making steam with oil will be about half the cost of making steam with coal."

"How is the supply of Texas oil for New York to be secured?"

"There will soon be a line of eight tank steamships running between Port Arthur, Tex., and New York city. We are at work now converting the boilers of seven of the steamships into oil burners. Two of the steamers are owned by the J. M. Guffey Co. of Pittsburgh; one belongs to L. Luckenbach of New York and four are owned by Mr. Chas. Counselman of Chicago. The steamship J. M. Guffey is already burning oil under her boilers. The eight steamers will make regular trips to carry oil to New York. It takes a tank steamer about twenty-one days to make the round trip. The line is expected to carry all the oil needed for fuel in this city; but additional steamers can be used as the demand increases."

Mr. Morse said that his company was converting the boilers of a tugboat to burn oil. The tugboat will have an oil tank instead of coal bunkers, and will be used in the harbor.

they had been doing was to act on the advice of the prince of Wales when he said "England must wake up." Mr. Pirrie thought that the best way for the government to help British shipping was to deepen the approaches to the chief ports, and otherwise improve them.

JAPAN MAIL STEAMSHIP CO. BUILDING NEW VESSELS.

Five new steel steamers with a combined tonnage of 17,800 are to be constructed by the Japan Mail Steamship Co. (Nippon Yusen Kaisha) for the service of the company with the United States, Japan, China and Australia. The contract has already been awarded to the Mitsu Bishi yard, Nagasaki. At the last semi-annual meeting of the Nippon Yusen Kaisha directors, the statement of the earnings for that period was given and it was also noted that the business had increased to the point where there was an actual shortage of tonnage on several of the lines. To remedy this it was decided to award the contract for constructing five additional steel liners immediately. It is possible that two of the vessels will be added to the present Seattle fleet if the business warrants. Relative to the corporation's earnings the following is culled from the last report:

"As the result of the inauguration of the regular tri-weekly service with six vessels, consisting of three ordinary and three auxiliary steamers, this line became very popular and the volume of cargo carried to America from the east during the period under review nearly doubled as compared with the previous period, while that carried on the homeward voyages during the same period was also doubled as compared with the corresponding period of the last business year. According to the report and the statement of accounts, the gross profits for the first half year were 11,241,000 yen, including 6,744,000 yen of freight, 1,274,000 yen of passenger fares and also government subsidies and bounties, and the expenditure represented 9,002,000 yen, leaving a balance of 2,238,000 yen net profit."

INQUIRY INTO AMERICAN TRADE CONDITIONS.

During the past year Messrs. Alexander Sahlin, J. Stephen Jeans, Ebenezer Parks and Enoch James visited the United States as the representatives of the British Iron Trade Association to inquire into the iron, steel and allied industries of the United States. They have now formulated their reports. Mr. Jeans, in his report, commits himself to the belief that the iron and steel trade is a growing one and is likely to continually increase rather than diminish. But in commenting on the United States Steel Corporation he speaks of the large profit of \$55,000,000 for the first six months of its existence and inquires:

"Is it not then justifiable to assume that if the Steel Corporation earned only £11,000,000 as net profits in such months of such good trade as that above specified, when they might be expected to have a chance of earning at last £20,000,000 a year in excess of the actual prices current in depressed times, the apparent possible profits under ordinary conditions and former prices in those times would, ex hypothesi, not exceed £2,000,000, subject to modifications in wages and a few other charges, which would hardly do more than pay 2 per cent on the £110,000,000 of 7 per cent. cumulative stock? And if the corporation had to face six or seven years of bed rock prices on these terms where would their prosperity be and how would their chances of continued life be affected?"

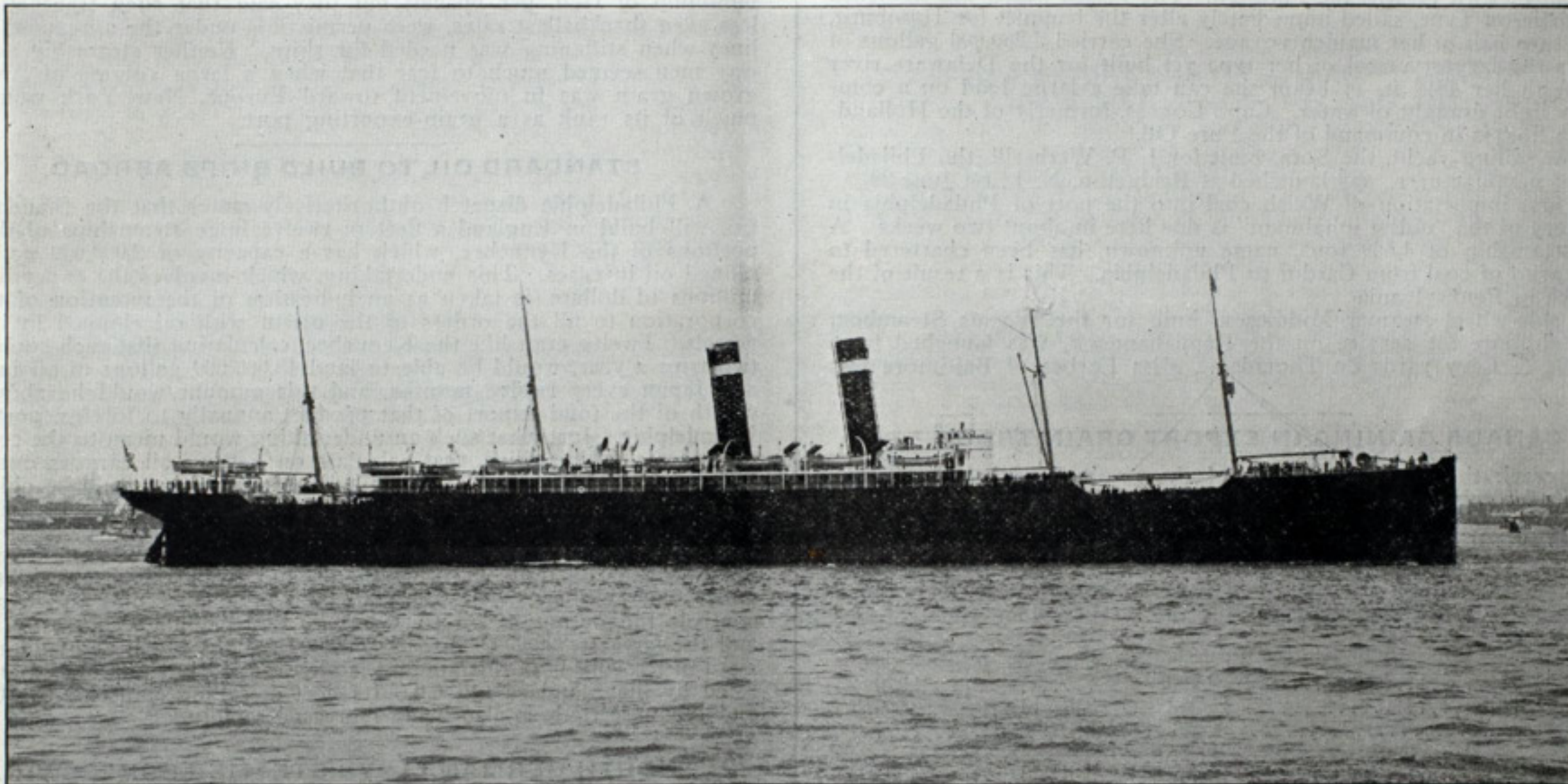
On the purely human side of the inquiry there are some interesting comments upon American habits of life, not only by J. S. Jeans, but also by Alex. Sahlin. The former remarks:

"One of the notable characteristics of the principal cities and industrial centers of the United States is the comparative absence of a leisured class, such as may be found in every country in Europe. The typical American appears to live only to work, and to work at something that will be a life-long career of usefulness to himself as an individual, and to the community as interested in mechanical improvements and economies. In the great manufacturing cities a man who has no regular business,

"Among American managers is often found a reminder of the college spirit and comradeship of youth. Each man feels attracted to his fellows working in the same field. They meet, exchange views to mutual benefit, and are always ready to ask or to give each other assistance or information. To this fellow feeling contributes greatly the congenial and hearty tone prevailing at the meetings of the American engineering societies first, and last the American Institute of Mining Engineers. Few of us who have been privileged to meet and know the men who are the leaders of this society but can thank them for many a friendship and many a hint which has helped to make our professional life more easy or more profitable. As an example of this spirit it happened, during my recent stay in America, that an isolated, large modern blast furnace, through a serious breakdown, came near being chilled. There were only two men to tide the disheartening work of trying to save the furnace—the manager and his assistant. Both soon became thoroughly worn out, and their bodily fatigue was reacting on their spirits. One blustery afternoon, two young blast furnace managers, both with fine reputations and excellent records, appeared at the furnace, having come from a distance, traveling bag with working outfit in hand. 'Say, old man; we heard you had trouble, and we know you are short handed; we came up to see if we could not take shifts and do what we can to help pull you through.' And be it said to the honor of the manager in trouble, he was not too vain to accept the offered assistance which his neighbors had shown the good will and faith in his broad-mindedness to venture to offer."

BOSTON STEAMSHIP CO.'S FREIGHT ROUTES.

The Boston Steamship Co., after three months of negotiation with J. J. Hill of the Northern Pacific and Great Northern railroads, has finally decided upon the destination of its freight steamers. By the transfer this week of the freight steamship Tremont, sister ship to the Shawmut, by Kidder, Peabody & Co. to the Boston Steamship Co., the



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THE RED STAR LINER KROONLAND.

Built by Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, Pa.

who is not concerned in the development of some industry, who is not an agriculturist, a railway man, a manufacturer, or engaged in a profession, is more or less at sea. He will find it much more difficult than in any European country to get men of character, capacity and intelligence to share his leisure in ordinary working hours, however learned they may be."

Alex. Sahlin in a chapter in his report on "Direction, Management and Labor" was struck with very much the same thing. He says:

"In America, the personal factor in iron making is recognized to be fully as important as that of plant. It is not the guns which win the battle, but the men who stand behind them. A good weapon, poorly aimed, is not dangerous, but neither will it do to arm good fighters with obsolete guns. In the above report I have tried to show that the guns—that is, the plants—are splendidly and powerfully equipped, that raw materials are plentiful and good, and that the system of transportation and handling is unexcelled. In this chapter I wish to speak of the men as I have learned to know them during twenty years of association. I have often heard it erroneously stated that the Americans worship dollars. This is not so, because a rich man as such is not greatly esteemed. What the American admires and honors is the ability to do; that capacity in a man, through his own sagacity, nerve, enterprise and skill to create and employ a fortune. Nobody in America seems to feel above his work or degraded by it. As it is done, and as is the result obtained, so is the man esteemed by his fellow men, and such is the place he will make for himself in his community or in his country. Everybody works, and works for the sake of work; and thus there has been produced in America in the short space of one generation an industrial potentiality which is more wonderful and more to be feared than the works and plants which these same workers have created. Nowhere is the struggling youth more kindly encouraged, more readily trusted, more generously aided, more gladly made place for, than in America, and when I say this I speak from personal experience, and with gratitude in my heart toward many of those busy and keen, but also generous and broad-minded American men of affairs." And again:

company now has its full quota of steamers. The Boston Steamship Co. has entered into a contract with the Northern Pacific and Great Northern railroads to establish a steamship line from Puget Sound to the Orient, in connection with the three Boston Tow Boat Co.'s ships, Pleiades, Hyades and Lyra. The Shawmut, Tremont and Hyades are to run between Seattle, Tacoma and Victoria, in Puget Sound; Yokohama, Kobe and Moji, in Japan; Shanghai and Hong Kong in China, and Manila. The Hyades sails on her first trip July 20, the Shawmut Aug. 21 and the Tremont Nov. 7. It will take three months to make the round trip.

The Shawmut arrived at San Francisco from the Atlantic coasts on Monday evening, June 30, having made the trip, stopping at Corónel, Chile, in fifty-two days, a new time record for the distance. The Tremont will take in part of a cargo of rails at Sparrow's Point, where she was built; will proceed to New York, where she will take on a general cargo, and then sail about Aug. 1 for San Francisco, stopping at St. Lucas and Corónel for coal, being due to arrive at San Francisco Sept. 20. The Lyra and Pleiades will run between Puget Sound, Vladivostok, in Siberia, and ports in North China. The Lyra makes her first trip from Puget Sound Aug. 5. The Boston Steamship Co., incorporated, which company was granted a charter at the last session of the Massachusetts legislature. The shares of the present company will be exchanged for the shares of the Boston Steamship Co., incorporated, on a share-for-share basis. No change will be made in the bonds.

The promoters of the Norfolk & Hampton Roads Ship Yard Co., which was chartered by the last session of the Virginia legislature, met last week and elected the following officers: Joseph B. Sanford, president; ex-Gov. Atkinson of West Virginia, vice-president; Mayor N. Beaman of Norfolk, treasurer, and D. P. Blont of Norfolk, secretary. When the ship yard is established it will be at Sewall's Point.

SHIP BUILDING IN PHILADELPHIA AND VICINITY.

Philadelphia, July 9.—The Nebraskan, third vessel launched by the New York Ship Building Co., Camden, N. J., which recently completed a successful trial trip, left the yards on Tuesday for New York. Capt. Randall, who has supervised the Nebraskan's construction, will have her in charge during the brief trip. As soon as she reaches New York the Nebraskan will go into dry dock to receive her final coat of paint and immediately after that she will sail with a full cargo on her maiden voyage to San Francisco, where she will enter the American-Hawaiian Steamship Co.'s regular service to the islands. On her maiden voyage the Nebraskan will burn coal, as did her sister ship, the Nevadan. Both vessels though have in their cargo complete apparatus to make them burners of fuel oil. The Nevadan is now in San Francisco where the oil burners will be installed in the furnaces, and when the Nebraskan reaches that port she will undergo a similar alteration. The J. M. Guffey, first vessel launched by the New York Ship Building Co., has made several successful voyages with oil fuel.

At the New York Ship Building Co. works, as in many other ship yards, the vessels built are known by their contract numbers. No. 1 is the J. M. Guffey, which, when launched, was christened the M. S. Dollar, but the name has since been changed. Nos. 3 and 4 were the Nevadan and Nebraskan, sister ships, built for the American-Hawaiian company. No. 2, still on the ways, is the Texan. She is 20 ft. longer than the sister ships, and is intended for the same firm. She will be launched in August. Nos. 5, 6, 7 and 8 are vessels for the Atlantic Transport Co. They are each about one-quarter completed. No. 5, when finished, will be the largest vessel ever built in the United States and will be considerably over 600 ft. in length. Work in the New York company's plant was almost at a standstill in many departments during the past week on account of a strike among the rivet heater boys.

The Pure Oil Co. entertained a number of guests at a banquet at Marcus Hook on Thursday in honor of the first shipment of oil in one of the company's own vessels, the Pure Oil. The vessel, which was launched at Newcastle-on-Tyne, sailed immediately after the banquet for Hamburg, on the return half of her maiden voyage. She carried 2,250,000 gallons of oil and is the largest vessel of her type yet built for the Delaware river trade. With her 48½ ft. of beam she can take a large load on a comparatively light draught of water. Capt. Cogess, formerly of the Holland-American line, is in command of the Pure Oil.

A new sailing yacht, the Sora, built for J. P. Wetherill, the Philadelphia paint manufacturer, was launched at Bridgeton, N. J., on June 30.

The first importation of Welsh coal into the port of Philadelphia in the memory of the "oldest inhabitant" is due here in about two weeks. A British steamship of 4,500 tons, name unknown, has been chartered to bring a cargo of coal from Cardiff to Philadelphia. This is a result of the coal strike in Pennsylvania.

The side-wheel steamer Middlesex, built for the Weems Steamboat Co. of Baltimore for service on the Rappahannock, was launched from the Neafie & Levy yards on Thursday. Miss Forbes of Baltimore was sponsor.

CANADA GAINING IN EXPORT GRAIN TRADE.

Last week the canal committee of the produce exchange of New York issued a table of statistics to show that Canada was fast encroaching upon the lead of the United States in the export grain trade to the detriment of New York more than to any other American port. The figures are put out by the association as an additional argument for the construction of a barge canal between Buffalo and New York. The table shows that the shipments for the week ending June 28 were as follows:

	Flour, bbls.	Wheat, bu.	Corn, bu.
Mobile	2,269	.....	2,996
New Orleans	15,353	353,740	7,809
Galveston	1,806	224,460	.....
Total	19,428	578,200	10,805
Total grain (bushels) by gulf ports.....			589,005
Total by other United States ports.....			742,806
Total by American ports			1,331,811
Total by Canadian routes			1,002,265

Of more significance, in the long run, than the distribution of the traffic, of course, is the great falling off in American exports of grain. Wheat exports are slightly above the average of years, but no corn whatever is being shipped out. It is just this falling off, a sequel of the corn crop failure of 1901, which is largely accountable for the present preponderance of shipments via Canadian ports.

"There is no Indian corn going out," said David Bingham, chairman of the produce exchange committee on discrimination in freight rates, "and there is more than the usual volume of wheat going from Manitoba to Europe. It is to the interest of Canadian transportation companies to carry this freight as far as possible on their own lines. Besides, the Manitoba wheat normally goes by Montreal. Then, too, the railways, acting, no doubt, through their joint traffic association, put up the rate from Buffalo to New York to 4½ cents a bushel. That rise diverted some American wheat to Canadian routes. The rate was later reduced to 3.9 cents, but, even at that, it failed to attract much freight.

"In the second place, the Atlantic steamship lines have fixed a minimum rate of 1½d. per 60 lbs. of grain shipped from American ports to London and Liverpool. Portland they do not control, nor is their authority complete at Montreal and Quebec. The effect of any cuts in ocean freights at Canadian ports would be to divert shipments from New York. As a matter of fact, however, the ocean freight rate from Montreal to British ports is about the same as from New York. Where shippers by Canadian routes have an advantage is in inland rates. The rate to Montreal from the foot of Lake Erie is about 1 cent lower per bushel than from Buffalo to New York, thanks to the Welland and St. Lawrence chain of canals. From the head of the lakes—say near Duluth—the rate is about 1½ cents a bushel less, thanks to those same canals.

"Notwithstanding all this, I am satisfied that when, after normal crops, this country begins again to export a normal quantity of grain,

New York will again obtain a fair share of the export business in grain, provided, of course, that the railway and steamship lines put no new obstacles in her way. Had we only the advantage of an Erie canal capable of floating thousand-ton barges we should suffer now considerably less from Canadian canal competition than we do in the present condition of that waterway. One oppressive incident of existing circumstances is the fact that on grain moved by Canadian routes the Canadians monopolize the profits and commissions. On business through Gulf ports New York dealers are given better chances to trade. Our position relative to the Canadians, taking into consideration fixed railway tariffs and minimum steamship rates, together with the possibility of attracting all the business by very slight shading of such charges, is best compared to that of the man who holds the candle while his competitor is selling out. One comfort, nevertheless, remains. If we do have a huge corn crop, it won't move in time to be shipped by water. Montreal will be frozen up before the corn is shipped, and New York will finally find its chance."

A railway traffic expert, whose familiarity with the grain trade is exact, was inclined to think the canal committee's figures on the advantage of shipping by Canadian routes somewhat high. The through rate from the head of the lakes to Liverpool via Montreal, he was inclined to estimate at not more than one-half or three-quarter cent less per bushel than via New York. He also pointed out that most of the wheat exported was Manitoba wheat; that farmers of that province had neither the warehouses nor the cash to hold wheat; that when no buyer presented they even shipped the grain to London for sale on commission; that Canadian railroads were likely to make concessions to keep the freight on their tracks till the port of shipment was reached, and that some cutting of ocean freights might be going on at Montreal. In any case, that port had an advantage over New York in low port charges and nominal elevator charges.

Steamship men admitted that wheat had been taken from Montreal to certain British ports at 6d. the quarter, or just one-half the agreed minimum of 1½d. per bushel; but they said that such transactions, at less even than ballast rates, were permissible under the agreement of the lines when stiffening was needed for ships. Neither steamship nor railway men seemed much to fear that when a large volume of American grown grain was in movement toward Europe, New York would lose much of its rank as a grain-exporting port.

STANDARD OIL TO BUILD SHIPS ABROAD.

A Philadelphia dispatch authoritatively states that the Standard Oil Co. will build in England a fleet of twelve huge steamships of the proportions of the Kennebec, which has a capacity of 2,000,000 gallons of refined oil in cases. This undertaking, which involves the expenditure of millions of dollars, is taken as an indication of the intention of the big corporation to fill the orders of the orient with oil shipped in its own vessels. Twelve craft like the Kennebec, calculating that each could make two trips a year, would be able to land 48,000,000 gallons of oil in China and Japan every twelve months, and this amount would be about one-eighth of the total export of that product annually to foreign ports from Philadelphia. Just what such an undertaking would mean to the countless deep water sailing ships, that calculate on getting oil cargoes out to the far east, is problematical, but it is believed that they would be obliged to seek business in other channels, because conditions at present point to a recurrence of what took place in the European oil trade.

At one time hundreds of sailing ships found lucrative employment in the European oil trade, carrying the product in barrels at a freight rarely under four shillings. The Standard built tank ships and now absolutely controls the output of oil to Europe. Philadelphia exports to Europe and the far east 300,000,000 to 360,000,000 gallons of oil annually and upward of two-thirds of this amount is now carried in ships owned and operated by the Standard Oil Co. Its fleet of sailing ships for the Chinese and Japanese trade is also being increased rapidly.

NORTH GERMAN LLOYD STEAMER SCHLESWIG.

Consul J. E. Kehl of Stettin sends the following:

"The new North German Lloyd single-screw steamer Schleswig, launched at the Vulcan yards in Stettin on May 10, is intended for the South American trade. Her mechanical and engineering details are: Length at water line, 450 ft.; beam, 52 ft.; molded depth to upper deck, 33 ft. 6 in.; power, 4,000 H. P.; speed, 13½ knots; bunker capacity, 1,630 tons; displacement (with full cargo), 12,600 tons; crew, ninety. A double bottom covers the ship's length, and the hull is divided into eleven water-tight compartments. Two steel masts support fourteen yardarms for the discharging and taking on cargo, in addition to two steam cranes. The ship is provided with a cold storage room. The passenger accommodations consist of sixty-four first-cabin rooms, with 157 berths; six second-cabin rooms, with twenty berths; and space for 952 steerage in six compartments."

Steel castings which the Seaboard Steel Casting Co., Chester, Pa., has made for the two steamships building at the Eastern Ship Building Co.'s works, New London, Conn., for the Great Northern Steamship Co., are regarded as among the most remarkable castings ever made in steel. The stem castings and the three castings comprising the spectacle frame for one of the vessels have already been shipped by rail. The castings for the lower portion of the stern posts were so large, however, that it was impossible to send them by rail and so they are to be sent by sea. The rudders alone weigh close to 50 tons each and are made up of five pieces. It is 60 ft. from the top of the stock to the bottom of the fin. Standing upright they are as high as a five-story house. The machine work upon the castings was done at Roach's Ship Yard. In making these castings, which were unlike anything ever before made in cast steel, the Seaboard company has done well. Out of the whole number of castings only one was lost, despite the fact that they were all submitted to Lloyd's rigorous tests.

The Mallory line of New York has given to Roach's Ship Yard, Chester, Pa., a contract for a steamer that will be one of the finest in its service. The vessel will be over 400 ft. long, will have triple-expansion engines and is expected to make 17 knots an hour.

AROUND THE GREAT LAKES.

It is estimated that fully 40,000 excursionists took to the water at Detroit on July 4.

Capt. Frank Higgle of Chicago has sold the schooner Commerce to George Flood for \$3,000. Capt. Flood will cut the boat down to a lumber barge and tow her behind the Sanilac.

During the month of June the marine postoffice at Detroit delivered 43,425 pieces of mail and received 13,895. Money orders to the number of seventy-one were issued for an aggregate sum of \$1,407.29.

Passenger Agent Herman of the Cleveland & Buffalo line passes around a new advertising novelty about every week of late. They are all well selected. The latest is a desk tray bearing a very good colored likeness of the steamer City of Erie.

The Cleveland-Cliffs Iron Co., one of the largest of the Lake Superior mining concerns outside of the Steel Corporation, is said to be negotiating for the famous Section 30 property of Minnesota. The Cleveland-Cliffs company has no Minnesota properties as yet.

Almost everybody who has had business dealings with the L. P. & J. A. Smith Co. of Cleveland within the past fifteen years or more knew John R. Semple, a trusted and faithful foreman in the several branches of dredge and towing operations conducted by that company. He died at his home in Cleveland Monday, aged fifty-six years.

The offer of Drake, Bartow & Co., of Cleveland, of \$100,000 for the Roanoke Iron Co.'s furnace and \$25,000 for the Roanoke Rolling Mill, both of which are idle and in the hands of receivers, has been declined by the creditors of C. R. Baird & Co., of Philadelphia. The Cleveland firm announces that negotiations are ended so far as it is concerned.

Capt. M. Fitzgerald, master of the steamer Hadley, which took part in the collision near Duluth a few weeks ago in which the steamer Wilson was sunk and nine men were drowned, has appealed from the decision of the inspectors at Duluth, who revoked his license after an extensive investigation. The appeal is made to Supervising Inspector Sloane at Dubuque, Ia., who is in charge of the Duluth district.

Canada's courts are also inclined to divide damages in collision cases wherever reason is found for doing so. In the case of the schooner J. F. Card, registered at Detroit, against the steamer Hiawatha, registered at Cleveland, an action for damages sustained in a collision between the two off Thunder bay on May 12, 1900, during a fog, Judge McDougall at Toronto has rendered an exhaustive judgment, in which he finds that both the schooner and the steamer were running at an immoderate rate of speed and that therefore the schooner can recover only one-half the amount of damage she sustained. If the parties cannot agree upon this amount, the same will be decided by the court after hearing evidence. The case was first tried at Sandwich last February.

Customs officials of Chicago have compiled a list of the passenger carrying craft running out of Chicago, with the total number of passengers each may carry. The Lake Michigan boats only are considered, and of these there are twenty-nine, with a total capacity of 23,177. The biggest carrier in the fleet is the steamer Christopher Columbus, which is licensed to carry 4,000 persons. The smallest is the tug James Hay, which may carry fifty persons in the excursion business, but which as a tug carries but four. The steamers Puritan and City of Milwaukee of the Graham & Morton line and the Virginia of the Goodrich line break even in the contest for second place in capacity, with 2,000 each. Other commodious vessels, with numbers they may transport, are: City of Chicago, 1,900; C. H. Hackley, 1,500; City of Racine, 1,100, and Indiana, 1,000.

NEW D. & C. STEAMERS—LAKE SHIP YARD NOTES.

Formal announcement of the contract has not been made, but there is no longer any doubt as to the building of two very large side-wheel steamers for the Detroit & Cleveland Navigation Co. The vessels will be built by the Detroit Ship Building Co., and work upon them will begin as soon as details of design are completed by Mr. Frank E. Kirby, who is representing the steamboat company. One of them will probably not be completed until the spring of 1904. They will be 30 ft. longer and 3 ft. wider than the steamers Eastern States and Western States, just completed for the Detroit & Buffalo Steamboat Co. The passenger capacity of each will be 3,500, with sleeping accommodations for 1,000 and deck room for 900 tons of package freight.

The Bertram Engine Works Co. of Toronto has evidently given up plans for the establishment of a ship yard at some point in Canada where they could build lake freighters of greater dimensions than the limits of Canadian canal locks, as it is announced that the 5,000-ton steel freight steamer which the Toronto company was to build for James Playfair of Midland, Ont., will be constructed by the Collingwood Ship Building Co., Ltd., of Collingwood, Ont. The Collingwood company also has an order for a similar vessel for Hagerty & Co. of Toronto, and its works will be very busy until next spring. The dock at the Collingwood works is to be increased to 530 ft. length.

Prof. Durand of Cornell University, who is in charge of the engineering work connected with the establishment of the new St. Clair river ship yard (Columbia Iron Works), says that the first keel would be put down at once if material could be secured. It is expected that stock for the first vessel, the Boland-Prindeville lumber steamer, will be delivered shortly. The new company has given up, for the present at least, the construction of a grain carrier with hopper bottom, which was proposed some time ago. They find sufficient demand for vessels to delay building on their own account, and would undoubtedly have quite a busy establishment on the St. Clair river by this time but for delays which they are encountering on the score of material. Port Huron promoters of this enterprise are proceeding in a modest fashion but propose to have an excellent equipment upon a small scale. The company's idea is to have the plant grow as the demand for vessels increases, and therefore to avoid making the initial burden upon the stockholders a heavy one.

Of the ten steel steamers of Canadian canal dimensions for which orders were placed recently with the American Ship Building Co. by Mr. A. B. Wolvin, representing the syndicate that is to develop trade down the St. Lawrence to Quebec, four will be fitted with Babcock & Wilcox water tube boilers. The others will have Scotch boilers. These

steamers will afford opportunity for determining the relative value of water tube and Scotch boilers in lake freighters, as hulls and engines of all the vessels will be alike.

The Lorain ship yard of the American Ship Building Co., working two berths, has launched in seven months seven steel steamers of a little more than 5,000 tons average capacity. With the present shop equipment at Lorain work goes along more rapidly with only two vessels on the stocks than would be the case with three vessels.

LAKE ITEMS IN THE SUNDRY CIVIL BILL.

The sundry civil bill, as passed and signed, contains many items of interest to the great lakes. In fact nearly everything that the Lake Carriers' Association sought is provided for in one way or another. The sum of \$10,000 is appropriated to establish a light and fog signal station on St. Martin island, entrance to Green bay, Lake Michigan. The sums of \$30,000 and \$65,000 respectively are provided for tenders for the inspector and engineer of the ninth lighthouse district. A lightship is to be provided to mark Peshtigo reef, Green bay, at a cost of \$15,000. The sum of \$10,000 is provided to complete a light and fog signal station to mark the outer end of the main channel entrance to Toledo harbor. After much discussion \$18,000 is secured for a light and fog signal station at Crisp's point, Lake Superior. The sum of \$4,000 is provided for the maintenance of the lightship Kewaunee on the southeast shoal, Point au Pelee passage, Lake Erie, and \$45,000 additional is provided for the construction of a modern steel auxiliary steamship to mark this shoal. A new light station will be provided at Conneaut harbor at a cost of \$8,500. Other provisions in the bill are: Ashtabula harbor light station, \$18,000; to reimburse the Lake Carriers' Association for the maintenance of lights in the lower part of Detroit river, \$4,000; Buffalo, N. Y., continuing harbor improvements, \$200,000; Cleveland, continuing improvements, \$107,000; Duluth harbor, completing improvements, \$459,727.50; Ashtabula harbor, \$200,000; Black river (Lorain) \$300,000; Detroit river, \$136,500; improving Hay Lake channel, St. Mary's river, \$144,115.

TO BUILD A BATTLESHIP IN THE NEW YORK NAVY YARD.

Secretary Moody has selected the New York navy yard as the one in which to build the first-class battleship provided for in the naval bill. There was a spirited contest for this coveted work among the various cities in which navy yards are established but New York won because it offered the best existing equipment. The secretary was satisfied that the \$175,000 specifically set aside by congress to prepare any yard for building a battleship could be utilized to the best effect at New York, where it will be used for erecting a large overhead traveling crane to serve every part of the ship and the shops which will be employed for working the material. At other yards it would have been necessary to expend the money for an altogether insufficient number of machine tools. This crane is expected to effect a great saving of labor and time, and place the New York yard on an equality with the most modern private establishments in those respects. Some money as well as time will be saved in the transportation of 15,000 or 16,000 tons of steel from the mills to New York, and a great advantage of New York over all other localities is that of skilled labor. At Philadelphia and Norfolk the building of a battleship would demoralize and to some extent exhaust the labor in neighboring ship yards on account of the relatively higher wages paid to government employes, and the progress on government contracts on the Delaware and James rivers would be seriously retarded. The disparity of wages is calculated at 30 per cent., wholly in the time lost by the government, which under the statutes is handicapped 20 per cent. by the eight hour law, private establishments working the force for ten hours on the same pay, and by the loss of eight working days as national holidays and of fifteen days for annual leave on full pay. The Boston yard had little consideration from Secretary Moody when he became satisfied that it would take at least two years longer to build a ship there than at Norfolk, if, indeed, it would not take that time to get that yard ready to carry on the work with any show of economy or rapidity.

Admirals Melville and Bowles have already begun the preparation of the detailed plans for machinery and hull, and Admiral Endicott of the bureau of yards and docks was directed to prepare the slip from which the ship will be launched and to get out specifications for the big traveling crane. Admiral Bowles promises to lay the keel within six months, which will be one or two years quicker than private contractors have made ready for the actual work of construction. Admiral Melville will make contracts for steel forgings for the shafts of the vessel within sixty days, and will have them turned before the hull is ready for them. The engines, Admiral Melville says, can easily be completed in two years, the steam engineering machine shops at the New York yard being superior to those of all the other navy yards and equal to those of the best private establishments. Admiral Bowles will spend nearly \$3,000,000 on the hull of the battleship. Admiral Melville will have something more than \$1,000,000 for machinery, and Admiral Bradford will spend about \$250,000. The armor and guns, which are taken from another appropriation, will cost about \$2,000,000. It is estimated that of the total cost of the ship over \$2,000,000 will go for labor.

Secretary Hay has addressed a communication to the British government regarding the appointment of a commission for investigation of lake levels. This is in accordance with the clause in the river and harbor act authorizing the president to appoint a commission of three experts on the subject to act with a similar body from Canada. The scope of the proposed investigation, together with names of gentlemen in this country who are mentioned as probable members of the commission, was dealt with at considerable length in a recent issue of the Review. Washington dispatches insist upon referring to Mr. Harvey D. Goulder of Cleveland as the lawyer member of the commission. Mr. Goulder has said that he is not at all inclined to accept the place if it is offered to him. He has favored the appointment of President Angel of Michigan University.

The American Car & Foundry Co. of Wilmington, Del., is completing a new steam barge for the Philadelphia Lighterage & Transportation Co., two large barges for the Reading railway and a harbor barge 66 ft. long for use on the Delaware.

CONCERNING SHIPS, SHIPPING COMBINES AND SUBSIDIES.

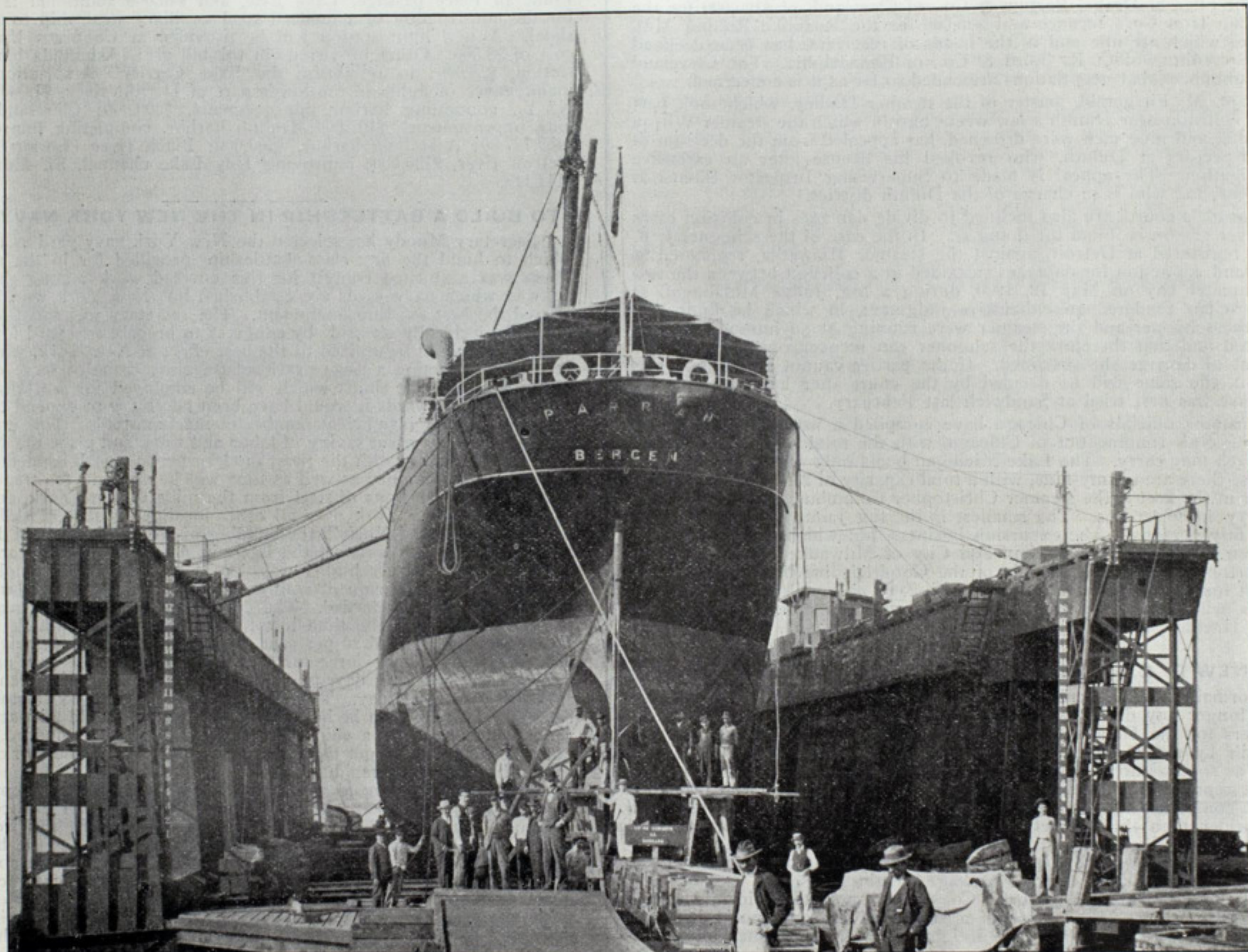
Glasgow, June 28.—The gossip about shipping combines continues fast and furious—in the columns of certain newspapers. Scarcely a line exists which has not been "combined" by some paragraphist with some other line. Sir Christopher Furness, who has become a sort of Britannic Pierpont Morgan in the minds of some sensation lovers, is almost daily credited with some extraordinary deal. If he has even contemplated one-half of the things he is said to have achieved he must be able to buy up and pigeonhole the entire outfit of J. P. Morgan & Co. If Mr. Morgan is going to run the British crown we shall hear of Sir Christopher Furness setting up his head office in the white house, and of Sir Thomas Lipton building a pork palace in Chicago as boss of a world's food trust. It is all very amusing, but it is not sense. American readers should take with a good many grains of salt the stories that are current about shipping deals in progress on this side. As a rule they emanate from evening newspapers, which know rather less about ships and shipping than they do about Sanskrit, and who swallow as gospel (and headline) any sort of rousing yarn that any sad-faced joker in the shipping world maliciously chooses to spin for them. By-and-by perhaps we shall be told some fine day (with extra sized headlines) that Mr. J. Pierpont Morgan is a myth, and that the American shipping combine has really been organized and will be managed by the emperor of China as a preparatory move

£1 10s. was paid. The insurance account amounted at the end of December, 1900, to £250,000. A row in the camp, however, has delayed matters and there is a movement to turn out the present directors and elect a completely new board, which may alter the complexion of affairs.

INQUIRY REGARDING SHIPPING SUBSIDIES.

The trade between the Clyde and South Africa has been growing to such an extent that the fleet of steamers engaged in the traffic has been nearly doubled within the past few months. The Clan line used to have almost a monopoly of this trade, but a couple of months ago the Ellerman-Harrison line supplemented the sailings to the Cape, and now this service is busy and prosperous. The Anchor line is about to start a service of its own. A couple of Clan liners left Glasgow the other day for South Africa with heavy cargoes of general merchandise. These were the Clan Mathieson for Algoa bay, and the Clan Macleod for Natal. The Clan Cumming has come in to load for South Africa. The stream of emigrants from British ports to the Cape is steadily increasing. The Clan and Ellerman-Harrison lines are now working in unison with the Union, Castle and Bucknall lines.

The select committee of the house of commons on shipping subsidies lately examined Mr. Edward Dodshon. This gentleman has had about



THE STEAMSHIP PARRAN IN THE NEW DRY DOCK OF THE HAVANA DRY DOCK CO., HAVANA, CUBA.

towards the Chinese invasion of the western world. Meanwhile, I find from an advance proof of Lloyds' annual statistics of the world's shipping, which will not be issued to the public until next month, that at the present time the world's merchant shipping consists of 17,156 steamers aggregating 25,859,987 tons gross and 12,472 sailers aggregating 6,577,776 tons—in all, 29,628 vessels and 32,437,763 tons. And of that vast tonnage 11,041 vessels and 15,546,897 tons are under the British flag, while 3,337,156 tons are American, 3,138,568 German, 1,632,757 tons Norwegian, 1,519,922 tons French, 1,159,082 tons Italian; all the other nations have under 1,000,000 tons each. Before such figures I don't think we need feel scary.

Among the numerous projects spoken of is one for an alliance between the Royal Mail Co. and other lines in the West India and South America trades. The Royal Mail Steam Packet Co. has issued a circular to shareholders notifying that since the last annual general meeting preliminary negotiations have commenced by which the operations of the company would be greatly developed and extended by association with other important British lines. The details are at present kept private but will be disclosed to the proprietors for their approval before anything definite is decided on. The Royal Mail Steam Packet Co. was established in 1839 by royal charter, and supplementary charters were obtained in 1852 and 1882. The subscribed capital is £1,500,000 in shares of £100, of which £900,000, or £60 per share, has been paid up, in addition to £350,000 of debentures. Dividends of £3 were paid in 1891, 1892 and 1893; £2 10s. in 1894 and £3 in each of the six years to 1900. For the first half of 1901

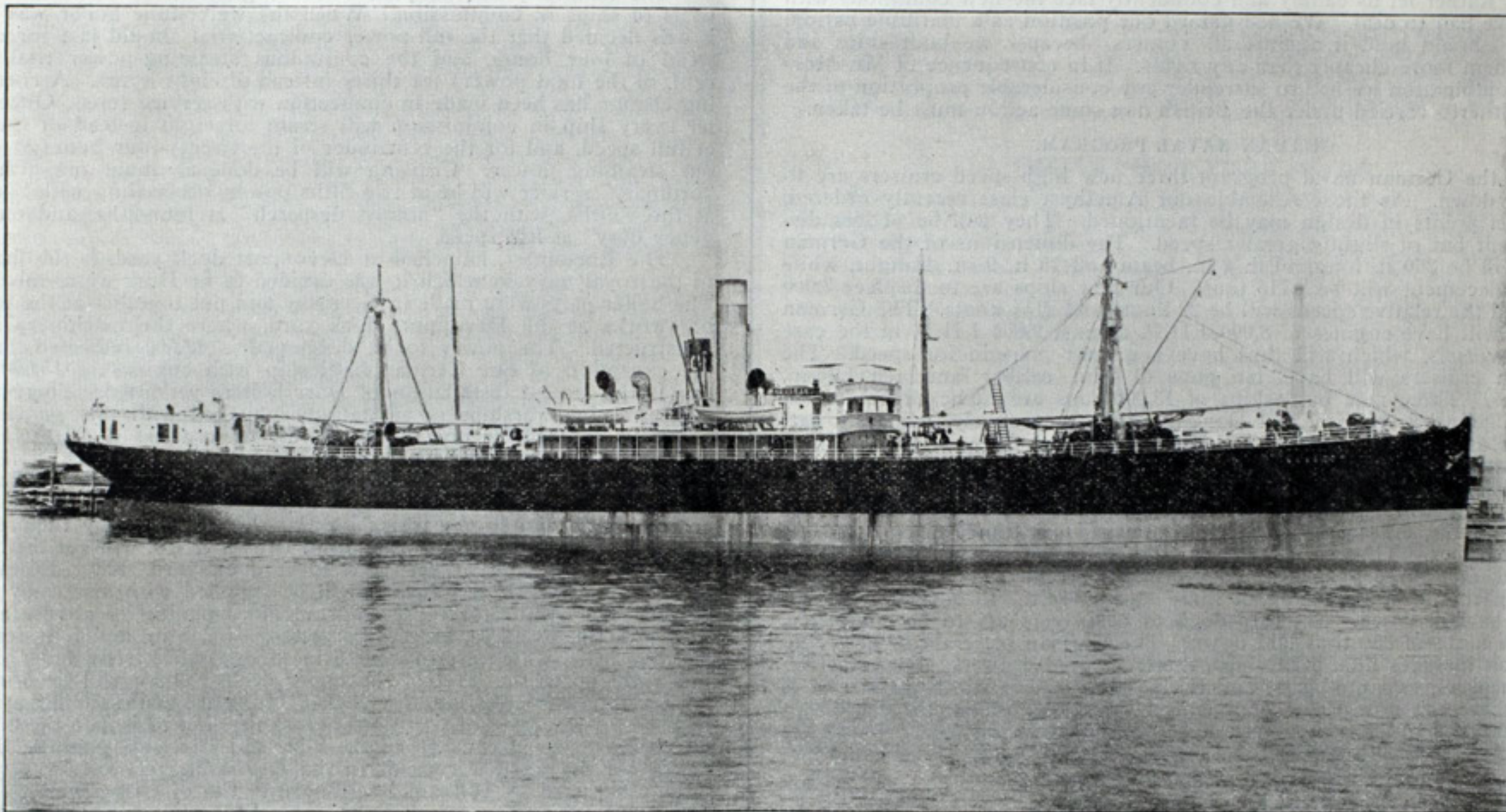
thirty-five years' experience of shipping traffic with the Levant and continental ports. He has made a special study of the German through preferential tariffs, which, he said, were absolutely different from any other tariffs in the world. They combined rail and ship carriage in one rate, practically fixed by the government. There was no very distinct means of distinguishing the rail from the ship carriage, because the government made a secret of the matter. It was obvious that the shipping interest benefited at the expense of the railway, for the railway rates were cheaper than any in Europe. A sum was subtracted from the railway rate and given to the shipping rate, this being possible owing to the government having the control of the railway undertakings. The probable reason for the German government keeping secret the proportions was that if the lowness of the railway proportion became known everybody would claim the preference, whether the goods were designed for shipment or not. In practice the thing worked out in this way, that goods going to the Levant were carried from Berlin to Hamburg much cheaper than goods merely going from Berlin to Hamburg. It is an export tariff, and nothing more, designed to encourage the export of German manufactures. Mr. Dodshon handed to the committee a series of tables. One of these showed that the highest amount falling to the railway was considerably less than one halfpenny per ton per mile for anything, and for most things between one-fourth to one-third of a penny per ton per mile. Roughly speaking the railway rate in Germany for goods going to the Levant was less than half the ordinary inland charge, and for goods going to East

Africa the rate was in the proportion of two to three. The Levant tariff was fixed with the object of capturing the Levant trade, and it has done so. Except for a few American rates there are no railway rates in the world so low as these two German tariffs. In England the lowest railway rates for shipping goods are those of the London & South Western Co. between London and Southampton docks. For the carriage of shipping goods, either way in wagon loads, rates are: For class 1, .79 of a penny per ton per mile; for class 2, .95 of a penny per ton per mile, and for class 3 it is 1.05 penny per ton per mile.

The committee heard also evidence by Sir Robert Giffen, formerly chief of the statistical and commercial department of the board of trade. He stated his opinion that legislation should be looked at from the point of view of keeping our ships rather than satisfying this or that humanitarian view. He could not go into the sufficiency of the supply of sailors in the mercantile marine, because he was not sure how far the crews of the mercantile marine would be available in the time of war, as large crews would be wanted for the merchant ships used for carrying supplies. He thought there should be a large proportion of British seamen on board the mercantile marine. The larger part of the crews and persons employed on the ships were necessarily not seamen in the proper sense of the word. Engineers, stokers, and even stewardesses were counted as part of the seamen on the mercantile marine; and the numbers that would be available for ships of war, whether British or foreign, would be comparatively small. It was important that as soon as possible the government should encourage the maintenance of British ships. If it were found necessary to sweep away some of the stipulations which were somewhat discouraging to the British seamen it should be done. The subsidizing of our ships, he admitted, would involve very large sums indeed. Foreign governments must come to terms. We should try to negotiate and intimate, first of all, what our policy is going to be. He objected to the use

fair play in certain points he was prepared to take care of himself, in spite of foreign competition, but he could not be treated in the future as he had been treated in the past. The first thing they wanted was the abolition of light dues. Nearly £2,000,000 which had been collected for this purpose from the ship owners was unexpended. Mr. Renwick said he thought Great Britain ought to have its coast trade exclusively in its own hands, and, if possible, it ought also to have the trade between the mother country and the colonies, and the inter-colonial trade. The United States, Russia, France, Germany, Spain, Portugal, and even Egypt close their coasts to foreign trade.

Sir John Colomb, M. P., has been lecturing on British trade, international and external. In war the volume and direction of interchange in the case of the internal branch would not, he said, be varied by the mere fact of rupture with a foreign state; in the case of external trade it was otherwise. The result due to war on our trade was likely to be relatively more marked at colonial and Indian ports than at home ports. A declaration of war would affect shipping in much the same way as it would affect commerce; it would reduce our operations between British ports and foreign ports and our operations between foreign ports. The effect produced by fear of loss expressed in insurance rates was of immeasurable consequence on shipping in war time. Confidence would depend upon belief in the ability of ships to escape capture. This brought into review considerations concerning the international constitution of the mercantile marine, and concerning arrangements for the external protection of it. We could not withdraw from sea commerce in time of war. The withdrawal of the merchant flag from the sea might be possible for other nations, but not for us. It is our business to concern ourselves with the defence of our mercantile marine rather than its utilization for purposes of attack. The utility of a merchant steamer is limited by speed and endurance. Flight is the liner's only defense, and her power of



THE NEBRASKAN OF THE AMERICAN-HAWAIIAN STEAMSHIP CO.'S FLEET.
Built by the New York Ship Building Co., Camden, N. J.

of the word "reprisals" in regard to coasting trade. He did not object to the government making arrangements not to carry competition to extremes provided this country could secure a fair share of the shipping business of the world, and necessarily that would be a very large share. He did not object to the employment of Lascars on British ships, because they were British subjects and good seamen for certain purposes. He also said it was a matter of speculation whether the threat of restriction of colonial and coast trading would have the desired effect on foreign nations. It was quite on the cards that the German lines might seek to develop a trade with Dutch and French possessions in the east, and still they would be able to maintain a very considerable trade. He did not think subsidies would have the effect of raising prices. Sir Robert Giffen's evidence has been much commented on, but not generally agreed with.

NEWS OF THE OWNERS OF TRAMP SHIPS.

The ocean tramp does three-fourths of the ocean trade of the world. And as representing the views of tramp owners, take the evidence of Mr. George Renwick, M. P., managing owner of a large fleet of tramps. He said he was not in favor of direct subsidies except in very exceptional cases. For instance, where it was necessary to open up trade, say in the West India islands or the east coast of Africa, where there is not a sufficient inducement in the quantity of cargo or the number of passengers to put on a line of steamers, he would give a direct subsidy. He would do it for political reasons, and for the good of the country and the colonies generally. He thought it would be unfair to give subsidies to the big liners without giving them to the ordinary cargo steamers, and that would mean an enormous amount of money. He did not think that was necessary. The great so-called passenger lines are going in largely for tramp or cargo ships. The White Star, the Cunard, the British India, and the P. & O. companies are building a large number of cargo ships. Large liners could take care of themselves. If the British ship owner had

offence is restricted to operations against merchant ships. From this point of view the mercantile marine of other nations must be examined in order to estimate the actual danger to which our commerce might be exposed in war. Britain possesses forty-five vessels, the dual alliance twenty-two, the triple alliance twelve, and the United States eleven, over 4,000 tons and 17 knots. The forty-five British ships include five in the Atlantic combine.

Sir John Colomb's survey of the relative conditions and inherent properties of mercantile marine in their attack and defence aspects brought him to enumerate what should be two broad principles of British policy. The first of these is to encourage private enterprise to develop the speed, endurance and carrying capacity of British liners engaged in regularly carrying on the internal sea business of our empire, on conditions binding them to continue to run on their own lines in war and being prepared to receive suitable armament and gun crews on the outbreak of war. Between British ports and British ports our sea business would thus be carried on in war as in peace. We could not, Sir John pointed out, propose to arm vessels engaged in carriage to foreign ports. The second principle is that it should no longer be considered that the whole obligation and cost of providing for the security of British sea commerce and shipping should rest solely on the shoulders of British citizens domiciled in the United Kingdom, but that a common necessity demands a great British combine between all parts of the empire to secure in war the stability of the British economic position, and the existence of the empire itself. The general character of our shipping legislation has for some years tended to discourage British shipping enterprise. A policy of continuous pin-pricks has heavily handicapped our shipping business from a national point of view. The question of the invasion of the United Kingdom or of military descents by sea on any British territory is determined by the position of the ports of possible enemies, and the strength and composition of their mercantile marine. Our fleet now costs us over £30,000,000 a year, and if certain foreign nations go on developing sea

war power at the present rate we will certainly before long require £50,000,000 to provide for the prosperity of British shipping.

With regard to the shipping combine in relation to merchant cruisers, the navy league says that if it is open to the British government to secure by friendly agreement with the North Atlantic trust that there shall be no transfer of British ships, either those now entering the combine or those to be built for it in British yards to any foreign register, and likewise to contract that they shall continue to be officered and manned by the Royal Naval Reserve, our national interests would be safeguarded, and the navy league's objects—the preservation of valuable mercantile cruisers and fast transports—attained. If the government have reasonable proposals of this character before them they should be accepted, as such an arrangement could not fail to strengthen our maritime position in the event of war with any country other than the United States. In any event, the league appeals to the government to make the present occasion for a new departure in our mercantile policy, recognizing the necessity of linking up the different parts of the empire by a subsidized line of steamers suitable for admiralty purposes.

According to Lord Brassey, there are no indications of decline in the general prosperity of the country. On the whole the external commerce of the country has been more active and remunerative than might have been expected under the adverse circumstances caused by the war in South Africa, and, taking a broad view, there is full justification for the confidence that in any competition on even terms we are well able to hold our own as an industrial people. Adverting to the Atlantic combine Lord Brassey pointed out that some movement similar to that which Mr. Morgan had initiated was inevitable. The British government would take care that any engagements with the admiralty would be executed, but let us not, he said, lose our national dignity in unavailing and groundless alarm. Rather let us calmly and confidently face the new conditions with which we had to deal. We had gained our position as a maritime nation, and we should hold it against all comers, because we built ships and sailed them more cheaply than any rivals. If in consequence of Mr. Morgan's combination we had to surrender any considerable proportion of the trade hitherto carried under the British flag some action must be taken.

GERMAN NAVAL PROGRAM.

By the German naval program three new high-speed cruisers are to be laid down. As those resemble our Amethyst class recently ordered, the chief points in design may be mentioned. They will be of less displacement but of slightly greater speed. The dimensions of the German ships will be 360 ft. long, 40 ft. 4 in. beam and 15 ft. 9 in. draught, while the displacement will be 2,715 tons. Our new ships are to displace 3,000 tons and the relative speeds will be 22 knots and 21¾ knots. The German vessels will have engines of 8,000 I.H.P. against 9,800 I.H.P. in the case of our vessels, which will thus have a greater margin for speed. The German cruisers will have ten guns of 4-in. caliber and ten 1.46-in. weapons. Three new battleships of 13,000 tons are to be ordered from the Wilhelmshaven, Kiel and Dantzig yards, respectively, while six battleships are to be finished before the end of the financial year. These new battleships are estimated to cost £1,243,000 each. Their speed is to be 19 knots, as compared with the 18½ knots of the King Edward VII. class. They will have four 11-in. guns each to fire two rounds every three minutes, eighteen 7.12-in. guns, twenty-four small pieces, and six torpedo tubes. Three armored cruisers of 9,000 tons are to be pushed forward, and three protective deck cruisers are also to be advanced, in addition to the commencing of three new vessels. Two river gunboats are to be laid down. Six torpedo boat destroyers are to be completed, and six more of 350 tons laid down. The German program of new construction includes nine battleships, three armored cruisers, six protective-deck cruisers, two gunboats, and twelve torpedo-boat destroyers; and of these there are now to be commenced three battleships, three cruisers, two gunboats and six destroyers. The new construction vote is £5,638,428, of which £3,758,300 is for hull and engines, £1,511,800 for artillery and torpedoes, and £368,328 for miscellaneous expenses.

JAPANESE DOCK EXPERIMENTS.

The Japanese have been making some interesting tests with the battleship Asahi which was built at Clydebank, with the view of determining the best method of supporting such enormous vessels when they are in dry dock. The principal difference in battleships as compared with merchant ships is a concentration of weight within a limited area in the former. The hull and fittings make up only 38.1 per cent. of the total displacement, leaving 61.9 of load which is more or less carried in one or two confined areas in the structure. Machinery represents 9.9 per cent. of the total, coal 4.8 per cent., guns 11.1 per cent., armor protection 31.5 per cent. and the remaining 4.6 per cent. represents equipment. The point where weight is most localized is immediately near the barbettes with their large guns and gun mountings, forward and aft, where the load was found to be 80 tons per foot of the length of the ship, whereas at other points in the center of the vessel it varied from 60 to about 50 tons, due to the broadside belt, to the coal bunkers, and to the boilers and machinery. The weight immediately forward of the barbettes was 30 tons per foot and gradually dropped towards the ends. The contention is that the ship should be fitted not only with sufficient keel blocks and bilge blocks, but also with internal shores. This is now to be applied in all the Japanese ships, when docking. It is found, further, that when the ship settles on the keel block, there is a tendency for the sides to sag, owing to the great beam of the vessels. The Japanese have, therefore, decided that in addition to keel and bilge blocks heavy shores must be used to support the ship against the sides and the bottom of the deck. From the water-line to the keel blocks there are seven rows of shores, and these are wedged in position at different periods of the docking operations by gangs of divers engaged for the purpose. The bilge blocks are fitted by divers, and the result is said to be a very great reduction in the strain on the ship's structure.

SERIES OF PROPELLER TRIALS.

Dr. Froude's system of testing the resistance of ships by model experiments prepared the way for a great improvement in naval architecture, and enabled the designer to lay down the lines of his ship so as to develop a form which would give a most economical speed result from a predetermined horse power, with almost a certainty of attaining the desired result. One difficulty remained as to the form of propeller. Experi-

mental trials with models of propellers, in a manner analogous to that for ship hulls, have been made but the results have proved approximate rather than precise. The admiralty has determined to make comparative trials with the four ships of the Drake class, all fitted with propellers of varying proportions. In all the ships of the Drake class the propeller is the same, and is the result of tank experiments; but the blades being bolted to the boss can have their pitch varied so as to increase or decrease the coarseness. With such an increase one revolution represents a greater forward movement; and on the trials of the Drake, where the pitch was 24 ft. 6 in. the speed of 23.05 knots was got with 116 revolutions; whereas in the case of the Good Hope the same speed necessitated the engines running at slightly over 126 revolutions, because the propellers had a pitch of only 22 ft. 9½ in. The Leviathan represented the medium course; her propellers having a pitch of 23 ft. 9½ in. gave the ship a speed of 23.25 knots for 122 revolutions; and it is now proposed to see what results will be got from the King Alfred by still further increasing the pitch of her propeller. A reduction in the revolutions is desirable as the piston speed of the Good Hope exceeded 1,000 ft. per minute, which is a very severe trial of the machinery; but it is thought that in addition there is increased efficiency at higher speed. The slip of the propeller was least in the case of the Drake; when the speed was 22 knots, the Drake on her full-power trial developed 30,557 H.P. when running at 116 revolutions, and then the coal consumption was 1.83 tons per horse power per hour. On her 30 hours' trial at 75 per cent. of the power 106 revolutions gave 23,103 I.H.P., the speed working out at 22.08, which is practically the same as in the case of the Good Hope. The coal consumption was 1.8 lb. On the low-power trial at one-fifth, the maximum speed proved to be practically 15½ knots for 6,937 H.P., the revolutions being then 72 and the coal consumption 1.72 lb. per H.P. per hour.

The admiralty has adopted a new regulation in reference to steam trials of ships in commission. When the water-tube boiler was adopted it was decided that the full-power contract trial should last for eight instead of four hours, and the continuous steaming-power trial (75 per cent. of the total power) for thirty instead of eight hours. A corresponding change has been made in connection with service runs. Once a quarter every ship in commission will steam for eight instead of four hours at full speed, and for the remainder of the twenty-four hours at continuous steaming power. Cruising will be done at about one-fifth power, "ordinary" service will be at two-fifths power, proceeding with "despatch" at three-fifths, with the "utmost despatch" at four-fifths, and on "emergency duty" at full speed.

The Encounter, launched at Devonport dock yard, is the first vessel of the royal navy in which it was decided to fit Dürr water-tube boilers. The boiler parts were made in Germany and put together at the engineering works at the Devonport dock yard, where the machinery is being constructed. The power to be developed is 12,500 indicated, and, with the exception of one German battleship with engines of 15,000 I.H.P., this is the largest installation of Dürr boilers yet fitted. There are only eight or nine warships of all nations launched with this system, which has been ordered for one of our third-class cruisers of 22,000 I.H.P. in combination with cylindrical boilers.

It is practically decided that the armor for all the three battleships recently ordered by the admiralty is to be made at Sheffield. The Vickers company will supply the plates for the ships which they themselves are building at their Barrow works; John Brown & Co. will get the order for the ship being built at the Devonport dock yard, King Edward VII; the Commonwealth at Fairfield will be supplied with armor by Cammel & Co. The armor for these ships includes plating of almost all thicknesses, 11 in. or 12 in. for the barbettes, 9 in., 8 in. and 7 in. for the respective belts, which are to extend in three strakes from under the water line right up to the level of the upper deck. There will be 5-in. armor for the four barbettes, one for each 9.2-in. gun, while similar armor will be used for traverses of partitions across the ship to isolate the 6-in. guns, which are to be placed behind the 8-in. and 7-in. side plating. The 6-in. armor for the six new cruisers of the Devonshire class, however, will be largely supplied by William Beardmore & Co. of Glasgow, who are in a first rate position for carrying out extensive orders for almost any thickness of armor.

The Fairfield Ship Building & Engineering Co., Ltd., has scored in the marked success of the official trials of the Bedford, just completed. This vessel is a first-class armored cruiser of the County class and was launched in August of 1901. On Tuesday last she left Devonport dock yard for the purpose of undergoing her official steaming trials. After the usual preliminary trials she was put on what is technically known as the thirty-hours four-fifths power trial, which was finished on Friday afternoon. On Saturday the vessel underwent the final trial of eight hours' steaming at the full power of 22,000 I.H.P., the mean power developed being 22,457 and the speed attained over 23 knots. These results are highly satisfactory, and the fact that the whole of the trials were completed between Tuesday and Saturday constitutes a record in the carrying out of the severe tests required by the admiralty.

Caird & Co., Greenock, launched a few days ago the large twin-screw steel steamer California, which they have built to the order of the Pacific Steam Navigation Co. This vessel's dimensions are: Length, 418 ft.; breadth, 52 ft.; depth, 36 ft. 9 in. She is of 6,000 tons gross. Her machinery, supplied by the builders, will consist of two sets of triple-expansion engines giving 5,000 I.H.P. The California is intended both for passenger and cargo traffic. She has accommodation for 130 first-saloon and 200 third-class passengers. Electricity is fitted throughout. The windlasses and winches are of the most approved type for the rapid loading and discharging of cargo.

Mr. F. H. Clergue is contemplating, in connection with his numerous other larger industries, the establishment of a dry dock at Sault Ste. Marie, though it is not definitely settled on which side of the river it will be built. It will be a gravity dock built on the Lake Superior level so that no pumps will be necessary to empty it, the water being permitted to run into the power canal.

An agreement has been signed by the Grand Trunk railway and the harbor commissioners at Montreal where the railway is granted a valuable site on what is known as Windmill point upon which to erect an elevator for the transshipment of grain. It is expected that the sum to be expended in improvements will reach \$1,000,000.

CANALS BUILD UP RAILWAYS.

Mr. S. A. Thompson, who was quite active when a resident of Duluth in all undertakings for waterway improvements, and who gained the name of "Deep-Water Thompson" through frequent advocacy in Washington of a 20-ft. waterway throughout the great lakes system, has a very interesting article in the current issue of the Engineering Magazine on "The Influence of Waterways on Railway Transportation." Of course he argues that a serviceable water route benefits and develops not only the world at large, especially the commercial world, but still more directly the pre-existing agencies of transport which, on imperfect consideration, it might seem to threaten or to supercede. "While the controlling effect of competing waterways on railway rates has been generally recognized," he says, "another effect, of equal or greater importance, has been almost completely overlooked. For, paradoxical as it seems, waterways are not only the most powerful possible regulators of railway rates, but are also the most powerful possible promoters of the prosperity of railways with which they compete. The best thing that could happen to every railway in the United States—or elsewhere, for that matter—would be to have a waterway paralleling every mile of its track, and the deeper the waterway, within reasonable limits, the greater would be the benefit derived by the railway."

In support of this opinion Mr. Thompson recites the history of canal development on a large scale in France, Germany and other European countries, presenting reports showing that traffic on railways competing with the canals increased to a greater extent proportionately than the traffic of the canals.

"The greatest railway mileage in the world under one management," says Mr. Thompson, "is to be found in Germany, unless some of the recent 'community of interest' arrangements in the United States are to be interpreted as constituting common ownership. On July 1, 1888, out of a total of 16,281 miles of road, 14,665 belonged to the German government. Yet the Reichstag, in 1887, passed an act providing for the completion of nearly 1,500 miles of canals and canalized rivers, although there were then finished and in use 1,289 miles of canals and 4,925 miles of canalized rivers. Other improvements have been authorized and completed since the date named, until today Germany has over 9,000 miles of canals and navigable rivers, and there are nearly 18,000 miles of state-owned railways in Prussia alone. Does any one believe that the German government would expend millions of marks out of the national treasury for the construction and improvement of waterways if the result would be to lessen the national revenues by reducing the traffic on the national railways?"

"The greatest cities in the United States are all situated on waterways, and the greater cities are without exception on the deeper waterways. The New York Central and its western connections, considered as one system, is paralleled by a waterway almost every mile of the distance from New York to Chicago; and where else in the United States can be found such a succession of prosperous towns and cities, almost within sight of one another all the way, as along the railway system named? Instances of this kind could be multiplied without limit."

"The truth is that there are three agencies of transportation, each of which has a fundamentally different function to perform in the commerce of the world, all of which are as essential as are the three sides of a triangle, and none of which can reach its highest possible efficiency unless accompanied by a symmetrical development of the other two. This trinity of transportation agencies is made up of the wagonway, the railway, and the waterway. Of these, the wagonway is commonly considered to be subsidiary to the other two—and so it is, in the same sense that a foundation is subsidiary to the superstructure. And the waterway is commonly thought to be antagonistic to the railways—and so it is in a sense and to a certain degree. For the three parts are not separated one from another and hemmed in like lakes by rocky shores. Their fields of action overlap, and their elasticity is so great that they can readily conform to all the ever-changing conditions and needs of that complex thing called commerce. The wagonway, however, is essentially local, the railway continental, and the waterway world-wide, in its sphere of action, while the distinguishing characteristic of the wagonway may be called availability, as speed is undoubtedly the distinguishing characteristic of the railway and economy of the waterway. And in the last analysis these three will be found to be not competitors, but complements—not antagonists, but auxiliaries. No one thinks of hauling corn or wheat from Chicago to New York in a wagon, nor of building a railroad from the barn of every farmer to the nearest grain elevator; and it is in reality just as absurd and economically wrong for a railroad to haul low-grade raw materials where there is a deep waterway properly located and equipped to perform the service."

"When traffic is carried by an expensive method when an economical method is available, it results in a loss not only to the community, but to the agency doing the carrying, the facilities of which ought rather to be employed in the transportation of goods of higher grade. Some years ago the directors of the Great Western Railway of England, being dissatisfied with the returns arising from the operations of the road, made an investigation which showed that the manager who was trying to drive a canal out of business, was using 58 per cent. of the total equipment in a traffic which produced only 14 per cent. of the total revenue."

"One-sided views are always wrong views, and the railway managers who look only at the traffic which would be taken away from their lines by a waterway, and not at all that which would be brought to them by the waterway, are as wrong and short-sighted as the mobs that destroyed power looms or harvesting machinery with the idea that fewer men would be employed. The surface roads in New York city desperately opposed the elevated roads, fearing that their traffic would be ruined thereby. But the surface roads are more profitable than before the elevated lines were built, and the latter possess an enormous and profitable traffic which it would have been utterly impossible for the surface roads to develop. The tonnage which goes around the Cape of Good Hope is as large now as before the construction of the Suez canal, which means that the traffic of 8,000,000 tons a year passing through that waterway has been created thereby."

"The first locks at St. Mary's falls were opened in 1855, in which year the registered tonnage was 106,296 tons. The half-million mark was reached in 1863, and the one-million ton mark was passed in 1873. In 1881, exactly co-incidental with the opening of a much larger lock, the northwest began to grow by leaps and bounds and the tonnage of the canal

rose from 2,000,000 tons in 1882 to 9,000,000 in 1890 and to 16,000,000 in 1896. During the past five years, two more enormous locks have been in operation, one of them on the Canadian side of the river, and in this short time the tonnage of the canal has leaped up to nearly 28,500,000 tons. This colossal tonnage is simply a manifestation of the development which has taken place in the northwest, along with which has come the building of thousands of miles of railroad, including two lines, from the head of Lake Superior to the Pacific coast. If by some cataclysm of nature the great lakes should be dried up, the enormous traffic now carried on their waters would not be divided among the railroads—it would simply cease to exist. The whole galaxy of cities from Buffalo to Chicago and Duluth would be overwhelmed in hopeless, irretrievable ruin, and the railroads could in no wise escape the general disaster."

"The development of the Northwest, which has come chiefly in consequence of the building of the locks at the outlet of Lake Superior, marvelous though it is, is but a faint and shadowy image of the development, similar, but multiplied a thousand fold, which will follow fast upon the completion of an Isthmian canal. Since it is 'not mileage, but cost of transportation, that is the true commercial measure of distance,' the continent will shrink until its eastern and western coasts are commercially but half as far apart, while yet no single acre of its wide expanse is lost. Manila, Yokohama and Hong Kong will be brought close to New York, Boston and New Orleans, while San Francisco, Portland and Seattle will become neighbors of Liverpool, Antwerp and Hamburg. Mines will be opened, deserts made to blossom as the rose beneath the magic touch of irrigation, towns and cities will spring up, and the western commonwealths grow populous and great, while the manufacturing cities of the eastern states, the cotton planters of the south, and the grain growers of the middle west, will find new and enlarged markets for their products. I can think of no portion of the United States which would not share in the benefits showered abroad by the construction of an Isthmian canal, but if I were asked to point out the interest which would receive the most abundant share of the benefits which would certainly accrue, I should, without an instant's hesitation, name—the railroads of the western states."

NOTES FROM FORE RIVER.

The seven-masted steel schooner Thomas W. Lawson will be launched at the Fore River Ship & Engine Co.'s yard, Boston harbor, in the afternoon of July 10. The stepping of her lower masts will be completed this week. The masts, which are 135 ft. from step to cap and weigh 17 tons apiece, are hoisted into place by a pair of wooden shears set up on the schooner's deck so that they can be warped along for stepping each mast in succession.

A new building has been added to the Fore River works. It is two stories high and contains offices for the foremen of the different departments in the hull division. The last vestiges of the old plant at Weymouth, Mass., from which the company moved two years ago to its present location at Quincy Point, on Boston Harbor, have been removed. The company has bought one of the locomotives which used to run on the Manhattan Elevated road in New York, and which has been displaced by the adoption of electric power, for use in its yard. The concrete work of the dock alongside the new fitting-out basin of the ship yard is well under way. The 75-ton gantry crane that is to run upon it is being set up and the equipment will be ready for use in finishing the cruiser Des Moines as soon as she is launched.

TRIAL TRIP OF THE TREMONT.

The speed trial trip of the new steamship Tremont, built by the Maryland Steel Co., Sparrows Point, Md., for the Boston Steamship Co., was made last week and was successful. The Tremont left the builders' yards in charge of Capt. J. Richard Thompson, with a representative of the marine department of the Maryland Steel Co. in charge of the engines. The speeding course was between Sandy point and Kent point, a distance of six miles and return. The Tremont developed a speed of 13.57 knots, which was more than the speed guaranteed in the contract. The Tremont, which was launched in May, is a sister ship to the Shawmut, which has just arrived at San Francisco from Philadelphia. She is of 17,000 tons displacement and 11,200 tons dead weight capacity. She measures 505 ft. over all, 488 ft. between perpendiculars, 58 ft. beam, and her depth to the upper deck is 40 ft. She has a straight stem and elliptical stern and three complete steel decks. The Tremont and the Shawmut, together with other vessels which have been procured, will eventually be used in trading between Seattle and the Philippines.

CARRYING SALT BOTH WAYS.

Buffalo, July 9.—Vessels are now engaged in bringing salt from Lake Michigan ports to Buffalo, and the same boats take cargoes of salt from Buffalo to Lake Michigan ports. The steamer Marion, the first of the fleet to bring salt here, will finish loading today a cargo of salt for South Chicago. She will be followed by the R. A. Packer, and there are more coming.

The salt shipped by lake from Buffalo is rock salt, mined in this state. The salt received here by lake is evaporated salt from Ludington and Manistee. Sufficient evaporated salt is produced ordinarily in this state to supply the eastern market, but the coal miners' strike has deprived the evaporating salt works of fuel, hence the strange spectacle of the same vessels employed in fetching salt to Buffalo and carrying salt back nearly to the starting point.

CLERGUE TO BUILD ANOTHER PAPER MILL.

Mr. Francis H. Clergue in an interview a few days ago said: "You can say that plans are being prepared by our company for a big paper mill to be located at Sault Ste. Marie, Mich. The plant will cost about \$2,500,000. It is yet too early to state when construction will commence, but it is hoped that plans will be completed in time to take advantage of the summer season for construction. The development at the American Sault does not contemplate our engaging in the steel business there for the present. It is the company's intention to prosecute the development of industries as expeditiously as possible on the American side until every water wheel is in use."

ELECTRIC TRANSMISSION OF POWER FOR NAVY YARDS.

BY WILLIAM S. ALDRICH.*

Electricity is being introduced into manufacturing establishments at an accelerating rate of progress. At first used for shop and office lighting, later for small motor service from the lighting circuits, it has now come to be the recognized agent for the transmission and distribution of power in almost all industrial operations. There are very few new factories, mills and ship yards where it is not the chief means so employed. In many of them it is designed to make this the sole system for all power distribution about the works. Meanwhile the rehabilitation, the modernizing of old establishments goes on apace. Costly and cumbersome belt transmissions are taken out to make way for the electric system, affording better shop lighting and ventilation and clear overhead room for traveling cranes. Fixed overhead shafting and pulleys are replaced by flexible wires and portable electric motors. For almost all kinds of machine work, beyond a certain size, motor-driven tools are now taken to the work rather than move the work about to the several fixed tools. Electric power is thus supplied, in the most economic manner, where most needed, and used only when required. The inevitable constant losses in any power transmission are reduced to the lowest value in the electric system. The maximum output is secured, on whatever basis it be reckoned—per day, per man, per machine or per square foot of floor space. Economy of manufacturing is guaranteed by increasing the quantity and enhancing the quality of the product, while decreasing the cost of production. If these, among many other well-known advantages of the electric drive have been recognized by private concerns, to what extent is it likely that they will become determining factors in the power equipment for government work, as in navy yards?

A navy yard necessarily combines the work of a private ship yard and a manufacturing establishment, on the one hand; and, on the other, that of a naval base and repair station. This composite nature of its work is subject to wide and frequently extreme variations. It must have equipment on hand and men within reach for all classes of work in marine engineering and naval construction. To secure the highest efficiency of management and greatest economy of maintenance, both workmen and tools should be kept quite regularly employed. This implies steady productive work on the part of the government akin to that of private concerns. Moreover, to meet the demands of naval repair work and the exigencies of war when they arise, there must be within easy reach a certain reserve of men, tools and power facilities.

The economics of production dictate one type of power installation and management. Naval repairs seem to require quite another type. We shall show, however, that to secure the highest efficiency (using this word in the broadest engineering sense), electric-power transmission serves the same ultimate purpose in naval repair work that it does in manufacturing. The latter is a steady load on any power plant, the former an occasional one. The large and constant mechanical friction losses due to shafting transmission are ever to be reckoned with. This is the case, whether the plant is busy or running light, whether it is manufacturing or engaged largely in repair work. It is the special province of the electric system to reduce all such losses to a minimum. It occasions no lost power in transmission or distribution during the idle periods of intermittent and repair work. It is ever ready to meet any demand for increased power and extension in any direction owing to the extreme flexibility of the system. These advantages, therefore—the ability at any time to work machines and tools to the limit of production at any location desired and to any extent within the capacity of the power plant—make the electric drive an ideal system, as well for steady work as for emergencies and repairs.

The naval events of our late war with Spain clearly showed the importance of the time element in preparation for service afloat. Ordinarily, men and material, tools and facilities may be had for the asking or for the advertising, especially for government work. The qualifications of the men required special investigation at such a time. Materials and tools not found in stock among private concerns could not be obtained when most needed in fitting out work. The power facilities and productive capacity of our navy yards, with the old systems of belting and shafting transmissions, could not be increased on demand. The time element is an equally important factor in each one of the above necessities. For successful navy-yard work on such occasions as these, the interests of the public service demand the highest efficiency throughout. A state of war brings about conditions in navy-yard work similar to those found in private establishments in seasons of rush orders and at the height of the busy season. The inability to meet these conditions in the former case scarcely elicited any public comment. Similar inability in manufacturing work would result in loss of further orders from the same source. It is the unexpected, the condition of maximum demand, which must be provided for, in either case. During the spring and summer of 1898, such navy-yard work as was done in line of production, overhauling, repairing and fitting out of vessels for the regular and auxiliary naval service was almost without exception accomplished at the old regulation or standard gait of all navy-yard work—at a pace established by a third of a century of peace. How could it be accelerated? With the very best intentions what could be done in the matter of expediting the work, with the accumulated traditions of that golden age for the navy-yard mechanic? Even those workmen who did not consider it a crime to speed up their machines could not, if they wished, meet the demand for the increased capacity with fixed speeds of main line and counter-shafting overhead. Neither could they get all of the power which they might require at any point and at any time to meet the conditions for maximum all-round efficiency in the execution of their work.

The element of time is destined to be of supreme importance. This is now the case in all of the arts of production. It is coming to be the case in the arts of destruction. Conditions may arise in either situation where it becomes the deciding factor. That establishment which can guarantee delivery of its products gets the business. The nation whose war vessels, before going into service, can be put through the usual navy-yard regime in the shortest possible time has an enviable strategic advantage. With the manufacturer it is a question of commanding the

trade, of accepting and filling orders, or of losing the business to those who can. With the government it is a question of commanding the seas, by quickly getting its vessels ready for service, or of losing the command to that nation which can and does have its vessels ready for war. Even the peaceful operations of a navy yard frequently require work to be executed by the quick-dispatch method. Were this not the case, slow-moving shafting and slow-speed machines would ever seem to suit the navy-yard mechanic, regardless of how and why they have now been discarded by the best, the most successful private establishments. If the efficiency of electric-power transmission, economy at the coal pile, increased output at decreased cost of production, have decided the private concern in its favor, these are none the less helpful factors toward deciding the case for its introduction in government work.

The engineering work of the government calls for the highest efficiency, in whatever field and from whatever point of view it may be considered. In the navy yard it is not simply the question of the efficiency of power transmission that is enhanced by the adoption of the electric drive; it results in increased efficiency of workman, of tool, of the whole process of production. Its inherent advantages for this field outweigh all of the old debatable questions of shafting efficiency and of coal economy. When work is required by the government to be done it must be done. That system which secures its execution in the most efficient and expeditious manner must commend itself for adoption. Facilities for rapid repairs at the navy yard constitute as much an element of sea power as provisions for rapid fire in action, and are to be similarly reckoned with. Efficiency, as it is understood today, in the larger engineering sense, not only includes but demands expedition. This is one of those engineering terms which has lately expanded in its meaning and value. The simple statement of the school books defines efficiency as the numerical ratio of the work done to the power available. The comprehensive meaning of efficiency in relation to naval power is thus summed up by Capt. F. E. Chadwick, U. S. N., the commanding officer of Admiral Sampson's flagship, in reference to the service rendered his fleet in Cuban waters by the United States naval repair ship *Vulcan*:

"No one can understand the value of such an adjunct who has not had to look around for ships to go on duty, the long list of waiters for repairs or overhauling was sometimes heartbreaking; a full third of such a fleet as ours had at all times been counted off as unavailable for such reasons and others."

What manufacturing establishment, with a complement of men and a trained personnel, could pay wages, much less get out orders and keep its business, with a full third of its material equipment at all times to be counted off as unavailable? These conditions, exasperating enough in times of war, are none the less likely to arise in seasons of nominal peace, and of unprecedented prosperity throughout the country. Such a season is the present. Perhaps it may be the case, or may sometimes be proven to be the case, that the most noted living steel-maker has correctly judged of the United States in saying that it cannot be conquered, so long as its integrity is maintained, from the Atlantic to the Pacific, from the lakes to the gulf, with its almost unbounded resources of men and material, and its industries now so fully organized to develop both to the highest degree of productive capacity.

The use of electricity in navy yards is destined to be much farther reaching than merely to provide a more efficient system of power transmission. From all considerations in which it may be viewed it may be said, without a dissenting argument, that its introduction will inure to that more comprehensive efficiency in times of peace as well as of war. It will have an indirect strategic importance not yet tested in action, but now so thoroughly proven in the exigencies of business and the keen competition of trade. The efficiency of production now secured in manufacturing work spells economy. The efficiency of service to be secured by its introduction in navy yards will spell readiness. Dollars constitute the measure of value for business. Strategic advantage constitutes the measure of value for sea power. The manufacturer asks: Will it increase dividends? The government asks: Will it increase sea power?

The technical discussion of this subject is not new. Nor is it likely that the last word will soon be spoken in such a field as the industrial applications of electricity. A few of the principles and advantages of electric driving established in private concerns may seem inapplicable to the navy-yard power problem. On the other hand, there are special advantages accruing to its use in such a place that would certainly not decide its introduction in manufacturing work. It is not to be inferred that electric-power transmission should be introduced in the navy yard at any cost. But, for the purpose for which a navy yard exists, it may be said that no system of power transmission has yet been developed possessing so many advantages and so few disadvantages as the electric system. It is thoroughly adapted to meet the largest variety of functions of this class of engineering work. For a limited class of mechanical movements, chiefly reciprocating, and for certain operations, as pressing, forging, flanging, riveting and caulking, steam, compressed air and hydraulic pressure will no doubt continue to be used. The power characteristics as well as economic considerations require to be carefully detailed in each and every kind of productive work. To this the navy yard offers no exception. The program for the execution of its work should in no wise be influenced by the question of power transmission. The reverse should be the case. The system of transmission should be determined by, rather than itself determine, the conditions for most efficient and economic production. The latter involve the area to be served by work or portable tools, or both at the same time; the grouping of departments; the arrangement of machinery; the style, type and size of machines and tools; the number and kind of operations to be performed simultaneously; the cutting and other operative speeds; the character of loads and their variations; the kind of work to be executed and materials to be employed. The system of power transmission adopted should not in the least interfere with the natural development of any one of the preceding elements of production. It should, if possible, enhance their relative or absolute importance.

Electric power in ship yards has proven its value for this class of work, especially during the past four years. It has been severely tested in everyday work, and not found wanting. One of the special reasons for

*Mr. Aldrich is a member of the American Society of Naval Engineers, and this article is from the Journal of that society.

this result has been its adaptation in serving power to widely distributed points and groups of buildings. It has insured greater freedom, a larger degree of movement in almost all branches of ship and engine construction. Electric motors now economically perform the work of many small and scattered steam engines of the old type of ship yard. The cost of power by distributed steam engines is today prohibitive in private yards, compared to the economies effected by concentrated steam-power generation. In so far as private and government yards have such work in common, can the latter continue to employ antiquated methods of power distribution?

The wandering of work is likely to be excessive in such widely scattered buildings as exist in ship yards. It has at last been minimized, if not altogether obviated by the use of electrically-driven portable tools—one of its adaptations specially invited by the extreme flexibility of the system. The similar movement of men and material has always constituted a like disadvantage in ship-yard work, to which the electric system has applied an efficient and economic check. It has been especially in the matter of dock repairs that the problems of lost time between shop and ship defied any solution till the introduction of portable tools. Any radius of action may be maintained at any time, and to any amount of power needed, and with less time required by the electric than by any other system for shifting of workmen, tools and material. Moreover, it admits of simultaneous operations, by portable tools independently driven or operated.

Before proceeding to a detailed study of the application of electrical transmission in this field it will be helpful to make a general survey of what may be termed the navy-yard power problem. It goes without saying that such a problem is of necessity quite comprehensive. It involves considerations not to be found in private establishments and ship yards. From its functions, as related to the public service, there is no peculiar obligation to serve commercial interests. Irrespective, therefore, of what system may be best in special instances, let us outline some of the conditions to be met in any case regarding power supply for a navy yard. It will be understood that every system, either proposed or adopted—as steam, compressed air, hydraulic pressure, wire rope and electricity—furnishes one or more of the suggested requirements composing any such general survey. No one system will solve the entire problem, expanding, as it is, in many directions simultaneously. Each year's experience furnishes new and more exacting requirements. That system which meets the largest number of conditions at the given time of its installation will be the best for that time. There is no guarantee but that in a decade or less it may become antiquated. We refer to the system becoming antiquated, not the equipment, machinery and appliances required for its utilization. These latter, of course, will have to be put into the scrap heap, sometime, in any system, unless the government's navy yards are to become more interesting museums for mechanical curiosities than they are now. Waiving all other considerations, this question of replacement or scrapping is probably the last one to be carried out in these yards, though now so common in private establishments for various recognized economic reasons.

Military and strategic considerations of the subject may be summed up as follows: To secure maximum efficiency of all navy-yard work by meeting the routine or emergency speed and power requirements necessary for intensified production, for any length of time and in any location within the yard enclosure; to secure rapid interchangeability throughout the system, by standardization and duplication of units, elements and spare parts; to admit of rapid and non-interfering extension and expansion of power facilities for any kind of navy-yard work, either on peace or war footing; to reduce to a minimum all delays due to accidents, casualties and shut-downs inherent or peculiar to navy-yard work, that they may be easily and quickly made good without interfering with or stopping any part of the system; naval-shop repairs to be accompanied by no losses or wasteful operations during necessary idle periods of intermittent work; dock repairs to be efficiently and readily executed by portable tools and shop appliances; power transmission and distribution system between shops, departments or buildings, to be kept out of all danger of the enemy's fire; to reduce to a minimum all fire risks, delays, casualties due to the enemy's shells; to continue all operations by supply of power from distant point, out of reach of an enemy, if the local navy-yard plant shuts down for any reason during a public exigency; to reduce to a minimum, especially during war, the necessity for supervision, superintendence, repairs, renewals, replacements of units or parts of the same; to best conserve the health, morale, discipline of all workmen that their individual efficiency may be kept at a maximum and fewest men required to execute any given work, especially during war.

The power plant should be located in an isolated house, reducing danger of fire from nearby sources; preferably by a water front for economy of fuel and water, and to secure transportation and conveying facilities for fuel, ashes and machinery.

Transmission system to be simple, flexible, reliable, convenient of application through wide ranges of load requirements and necessary speed changes of machinery and tools; and to possess inherently a wide range of other applications to serve the functions of a navy yard.

Equipment to admit of ready duplication, interchange and extension; that the generating units may be operated always at the most economic normal loads; that extensions of the transmission system may be made at any time, to any point and in any capacity; and that measurements of power wherever and whenever required may be readily made.

Re-organization of the power equipment of existing navy yards to be interfered with in the least by introducing the new system, which must be such as to require the least scrapping of machines and tools.

Expansion of shop facilities and arrangement of machinery and tools to better productive advantage, to be provided by new system, with such location in groups and shops as shall secure maximum output per square foot of floor space, rendering the location of shops and departments independent of the power consideration, that they may be placed on most available ground, within necessarily limited areas of the navy-yard enclosure.

Initial cost to be reasonable, but not necessarily the least expensive to be chosen, regardless of efficiency and cost of maintenance; and, while saving power, the interest, depreciation, repairs and renewals should be reduced to a minimum.

Operating features to permit of several simultaneous lines of work being executed on any project by portable tools; to allow of clear over-

head room for traveling cranes; to allow of individual, group or sectional driving, as may be best suited to the machine or work in hand; and, if individual driving is adopted, to allow of wide, easily-controlled range of speed changes for maximum productive capacity of machine or tool; and to supply power for auxiliaries and transportation.

In the system of transmission adopted, other applications than those of supplying power should, if possible, consist in supply of heat and light as required in a navy yard.

SHIP BUILDING DURING THE PAST YEAR.

Brief reference was made in the last issue of the Review to the report of Mr. E. T. Chamberlain, United States commissioner of navigation, regarding ship building in the United States during the year ended June 30. The report shows that during the year 1,657 vessels of 473,981 gross tons were built and officially numbered, compared with 1,709 vessels of 489,616 tons for the previous fiscal year. The proportion of unrigged vessels (scows, canal boats, etc.) included in these figures is shown in the following table:

	1902.		1901.	
	No.	Gross tons.	No.	Gross tons.
Steam and sail vessels of regular register..	1,360	416,479	1,173	401,285
Unrigged craft (scows, canal boats, etc.)..	297	57,502	536	88,331
Total	1,657	473,981	1,709	489,616

Excluding the unrigged craft, the commissioner presents the following summary, by districts, of vessels built during the year ended June 30, 1902:

	WOOD.				STEEL.				TOTAL.	
	SAIL.		STEAM.		SAIL.		STEAM.			
	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.
Atlantic and gulf	583	65,265	290	19,021	8	9,223	62	102,647	943	196,156
Porto Rico.....	5	89							5	89
Pacific	47	26,172	90	9,725			2	10,707	139	46,604
Hawaii	1	9	1	13					2	22
Great lakes	8	200	65	3,242			52	161,797	125	165,239
Western rivers.....	6	114	134	7,927			6	328	146	8,369
Total.....	650	91,849	580	39,928	8	9,223	122	275,479	1360	416,479

The decrease compared with last year is in sail vessels and canal boats, barges, etc. This year's new sail tonnage is 101,072 tons; last year's, 128,099 tons. This year's new canal boats, barges, etc., aggregate 57,502 tons; last year's, 88,331 tons. New steel steamers aggregate 275,479 tons compared with 235,265 tons last year.

Included in the total new tonnage are ninety-four vessels, each of over 1,000 tons, aggregating 315,062 tons, or two-thirds of the output. Of this large construction forty-one steel steamers of 158,631 tons were built on the great lakes. The lakes have built for ocean trade two West India fruit steamers, Watson and Buckman, of 1,820 tons each; one cargo steamer, Hugoma, of 2,182 tons, and two large cargo steamers, Minnetonka and Minnewaska, of 5,270 tons each, cut in two to pass the Canadian canals.

The output of completed steel steamers on the seaboard has been much below the indications of last July. The launching of nearly every large steamer has been delayed from three to eight months, and some are still on the ways which by this time were to have been in operation. The delays have been partly due to the steel strike last summer, to the great demand for structural steel in all directions, to low ocean freights and the lack of new ship building orders, which has left builders and owners without motive for haste. Last July 255,000 tons of ocean steel steamers were under construction or under contract, while at present only about 160,000 tons are under construction and no new large seaboard contracts are reported.

The year's new steamers on the seaboard, however, include the transatlantic liner Kroonland, 12,760 tons, the largest vessel ever built in this country; the Pacific Mail liner Korea, 11,276 tons, of 19 knots, the largest and fastest merchant steamer on the Pacific; Shawmut and Tremont, of 9,606 tons each, built for the opening trade with the Philippines, and Alaskan, 8,671 tons, for the New York-Hawaiian trade, the largest vessel ever launched into Pacific waters. The sister ships, Finland and Siberia, to the transatlantic and transpacific mail liners named, have been launched and will be officially numbered and in operation in the early autumn. Two steamers, Nevadan and Nebraskan, of 4,408 tons each, have been added to and two more of 8,000 tons each are building for the steam fleet to Hawaii around Cape Horn. The remaining nine new ocean steamers of 1,000 tons or more are for local coasting trades.

Two steel full-rigged ships, William P. Frye and Atlas, 3,380 tons each, and five wooden barkentines of about 1,100 tons each have been added to our square-rigged fleet. New large wooden schooners number twenty of 34,471 gross tons.

The steamer Weetamoo, which has been built to ply on Lake Sunapee, N. H., was constructed in a novel manner, as her hull was built in Baltimore, her engines in Boston, and she was launched in New Hampshire. She was designed by Sinn & Page, and built in the Baltimore Ship Building & Dry Dock Co.'s yards in that city. As soon as the hull was complete it was taken apart, and the pieces carefully numbered, loaded upon gondola cars, and shipped by rail to Lake Sunapee. At about the same time the boilers for the boat were purchased in Elmira, N. Y., and the engines in Boston, and shipped to the lake. About three weeks ago, Mr. Page superintended the relaying of the keel at the lake, and the riveting of the plates was begun at once. As soon as the boat was ready for the engines and boiler, they were put aboard and set up, and a few days ago the steamer was launched, and was in as good condition as if she had been put overboard where she was built. She is 60 ft. long, and has a capacity for eighty passengers.

A new towboat to take the place of the Pittsburgh harbor towboat Enterprise is now being built at the Elizabeth Marine Ways, Elizabeth, Pa.

AN AMERICAN TURBINE VESSEL.

The steam yacht *Revolution*, fitted with a turbine engine, and, according to her builders, intended to demonstrate that that form of engine is available for commercial use as well as for high speed, engaged in a race in New York harbor last Saturday afternoon with the New Jersey Central's steamer *Monmouth* and the fast steam yacht *Vamoose*. The *Revolution* is said to have beaten the *Monmouth* in an eighteen-minute run by a little more than a length and the *Vamoose* by a quarter of a mile. The vessels raced only about five miles, but the results of this short run are said to have been sufficient to satisfy Charles C. Curtis, who designed the turbine engines in the *Revolution*. Following is an account of the race from a daily newspaper correspondent:

"A strong southwesterly wind was blowing and the tide and wind were both against the boats, but on account of her size the yacht suffered the most from these causes. Prof. James E. Denton of Stevens Institute, Mr. Curtis, L. C. Ryce and a few others boarded the *Revolution* off the Battery at 3 o'clock. Then the yacht went down the bay and loafed about waiting for the *Monmouth*, which leaves pier 6 at 3:45 o'clock for the Atlantic Highlands. The *Monmouth* makes this trip in 1 hour 14 minutes, and her average speed is about 17 knots, or 22 miles, an hour. When sighted from the *Revolution* she was steaming along in the channel heading down the bay. At the same time the *Vamoose* was seen some distance ahead of the passenger steamer, evidently waiting for a race. At 4 o'clock the *Monmouth* got on even terms with the *Revolution* and before the yachts' engines could be opened up she had taken a lead of about half a length. The *Monmouth* was the middle of the trio, the *Revolution* was to the westward and the *Vamoose* to the east. At the start the *Vamoose* had a lead of about 200 yards, but this was soon cut down and then for some minutes the vessels were on almost even terms. Inch by inch the *Revolution* began to creep up and soon poked her bowsprit in the lead. At 4:11 the two were passing between the forts at the Narrows with the *Revolution* a quarter of a length in the lead. The *Vamoose* was far astern. Seven minutes later the *Revolution* was off Hoffman island and there was just a little piece of open water between her stern and the stem of the *Monmouth*. In eighteen minutes the *Revolution* had beaten the *Monmouth* by more than a length and this being satisfactory to all on board, the *Revolution* stopped.

"After the race Mr. Curtis showed what the yacht could do in the way of maneuvering. The great trouble with turbine engines has been with reversing. The Hon. Charles Parsons, the English turbine engine builder, uses an independent set of engines for reversing. On the *Revolution* the same turbine is used for going ahead and going astern. The yacht was running full speed ahead. The signal was given to stop and then go full speed astern and at the first attempt the yacht was lying dead in the water in twenty-six seconds. At the second attempt she was stopped at twenty-three seconds. Then after the yacht had been running ahead for a while she was turned in a circle of about 200 ft. in diameter, a little more than the length of the yacht.

"The *Revolution* was built by the Gas Engine & Power Co. and Chas. L. Seabury & Co., Consolidated, at Morris Heights, and her model is the usual yacht model designed for comfort and not for speed. She is 178 ft. over all, 139 ft. 6 in. on the water line, 16 ft. 6 in. beam and 7 ft. draught. The engine room is totally unlike that on any other yacht. On each side of the room are two domes, which cover the turbines. Big pipes about 10 in. in diameter carry the steam from the boiler to the turbines. There are no levers, but the steam is turned on by opening valves. From the turbines bigger pipes conduct the steam to the condensers. There are two turbines in the *Revolution*, one for each shaft, and on each shaft there is one screw. The engines have developed 2,500 H.P. The turbines are each 5 ft. in diameter.

"During the run the average steam pressure was 232 lbs. At times it went up to 249 lbs., but according to Mr. Curtis it ought to have been 255 lbs. The falling off was due to poor coal. According to the tachometer the average speed of the shaft was 645 revolutions a minute. Just how economical in use this turbine is has not been shown yet, but in point of construction it is cheaper than a reciprocating engine. A reciprocating engine suited to a yacht of the size of the *Revolution* would develop about 1,400 H.P. and run the yacht about 15 knots an hour. Such an engine would weigh twice as much as the turbines in the *Revolution* and cost twice as much to build."

Mr. Ryce, who is associated with Mr. Curtis, said: "We decided to build a yacht large enough to make a good demonstration that the Curtis steam turbine is adapted to meet all requirements of a prime mover for the propulsion of high-powered ocean-going commercial steamships up to the largest Atlantic liner, and at the same time a yacht which would not differ materially in general plan, in proportions, or in equipment from what is customary in engine-driven boats today. While the yacht is not built as a racing machine and makes no pretensions to beating everything in sight, she has, of course, a great deal more power and travels faster than any similar engine-driven boat of like character, size and displacement, simply because her turbines weigh less per horse power than engines would. But the most striking thing of all about the turbines in this yacht is that they are all always ready to run and have required no overhauling or repairs, no fussing or nursing. The yacht has probably been driven not less than 1,000 miles at high speed since she first left the yard last April."

Mr. Curtis is a son of George Ticknor Curtis and is a graduate of the school of mines, Columbia university. He is a member of the bar as well as an inventor. The turbine as developed in the *Revolution* has been the result of seven years' work.

REDUCING NAVAL FORCE IN THE PHILIPPINES.

In line with President Roosevelt's policy of extending civil government through all the islands of the Philippine archipelago, except those occupied by the Moro tribes, the navy department will shortly reduce the naval force in the Philippines to a peace basis. Nearly all the little gunboats captured or purchased from Spain will be placed out of commission and some of the cruisers will be ordered back to the United States. Secretary Moody has under consideration a plan for reducing the Asiatic fleet, but so far has not decided definitely on anything except the withdrawal of the small gunboats from active service and the recall of some of the larger ships. In line with the policy of President McKinley and former Secretary Long, a strong squadron will be maintained permanently in the far east, principally to let the world know that the United

States government has come there to stay and regards itself as a factor in that part of the world. All the armor-clads will be retained on the Asiatic station and the battleship *Oregon* will soon be sent to augment them. The plan which Secretary Moody has under consideration contemplates the detachment of one and perhaps two of the three flag officers now on the station. The tour of sea duty of Rear Admiral Rodgers, commander-in-chief of the Asiatic naval force, will end in the fall, but it is not unlikely that he will be recalled before then. The chances are that Rear Admiral Evans, the senior squadron commander, will be retained as commander-in-chief.

NAVAL WIRELESS TELEGRAPHY.

Wireless telegraphic equipment for the entire navy, including offices at all shore stations and apparatus on every ship, is to be installed as rapidly as possible under plans made by Admiral Bradford and approved by Secretary Moody. Orders have been issued and are now being carried out at the New York navy yard to fit all ships in commission for the apparatus by setting up wooden masts above the fighting tops, which will carry wires from yard arms 135 feet above the water line, and poles of similar height have been ordered put in position at the New York yard on the Navesink heights, and at Norfolk and Key West. Poles with crossarms and wires are already placed in the Naval Academy grounds at Annapolis and in the Washington navy yard, and between these two points in the next week or ten days a course of instruction for petty officers will be put into effect, to provide operators for all the stations ashore and afloat.

The system to be adopted for the service will probably combine the advantages of all the appliances now coming into practical use in Europe and this country, with such improvements as the electrical experts of the equipment bureau have devised in the last two years of close attention to the subject and regardless of exclusive claims by various inventors. Admiral Bradford and the officers associated with him have become convinced that no existing patents for the use of spark waves and tuned apparatus are broad enough to create a monopoly in wireless transmission. Three months ago he sent to Europe his chief electrical assistant, Lieut. John M. Hudgins, with two skilled petty officers, to acquire a practical knowledge of the systems being installed in foreign navies, and, if possible, to procure sets of all practicable apparatus. This mission has been eminently successful, and Lieut. Hudgins is now returning with eight sets of instruments, with which his petty officers have made themselves familiar. The success of this mission was largely due to Com'dr F. M. Barber, U. S. N., retired, who has been in Europe watching the development of wireless telegraphy and progress along other lines valuable to the navy for several years.

In Paris sets of both the Ducretet and Rochefort apparatus, which are used by the French and Russian governments, were secured, and in Berlin the Slaby-Arco system, used in the German navy, and the Braun-Siemens-Halske system, regularly operated from the mainland to Heligoland and to various lightships, were purchased. Interesting and valuable experience was obtained in France and Germany, where regular schools of instruction were attended by the Americans and where numbers of apprentices are being made expert in handling the instruments. Wrong adjustments are intentionally made in setting up the apparatus for pupils, who are put to the test in finding the difficulties and correcting them, and obstacles to transmission are ingeniously hidden, to be overcome by the operators before certificates of qualification are given to them. No effort was made to secure sets of the system which has been adopted by the Italian and British navies, because Admiral Bradford had been unsuccessful in making terms with the inventor, Marconi, last year. Marconi then declined to supply instruments except on annual rentals, with a royalty of \$500 a year, and under other restrictions, which were regarded as impossible for a navy which in a national emergency might have its supply of instruments and operators cut off, and thus be suddenly compelled to build up a new service. Marconi's attitude led Admiral Bradford to determine that the American navy should have a system of its own, if necessary to preserve its independence, and out of that decision has developed a condition which promises results of much benefit to the world, through the organization of a great corporation with the object of harmonizing all the systems, and so enable the interchange of messages between countries which have adopted and put into use different forms of apparatus. At present the German, French and English systems, from mechanical causes or business rivalry, cannot or do not exchange messages, and the general use and development of wireless telegraphy are impeded to that extent. The prospects, however, are now good that an agreement will be reached by which the best features of all the systems will be combined for commercial uses exactly as the American navy proposes to do on its own account for war purposes.

The navy department, since taking its present stand and succeeding in finding practical apparatus of several forms for sale in the open market, has also learned that several American makers of electrical apparatus are anxious to supply wireless instruments, and has received offers of several untried but promising systems for tests. Admiral Bradford will also give Prof. Fessenden, the weather bureau inventor, an opportunity to perfect his system for warships, if its operation will not be affected by the discharge of great guns.

The keel of the battleship *Nebraska* was laid on July 4 at the ship yard of Moran Bros. & Co., Seattle, Wash., in the presence of a large crowd. Among the distinguished guests were Gov. Savage of Nebraska and staff, Gov. McBride of Washington and staff, and Rear Admirals Casey and Endicott of the navy. The governors of the two states, Washington and Nebraska, were requested to doff their coats, roll up their sleeves and drive the first rivet in the first battleship under construction in the Pacific northwest. They swung the sledges to the amusement of the crowd and the satisfaction of Robert Moran.

In an interview at Sydney, Mr. David Baker, general manager of the Dominion Iron & Steel Co., said that the company had sold its entire production of steel billets and slabs for some time to come.

One of the large band sawing machines made by the Atlantic Works Incorporated of Philadelphia was recently sold to the government for use in the navy yard at Portsmouth, N. H.

FOR THE CARE OF SICK OR DISABLED SEAMEN.

Vessel masters often find difficulty in locating at different ports around the country the hospitals and physicians with whom the government has contracts for the care of sick or disabled seamen. The treasury department makes contracts of this kind each year and publishes a circular giving charges for medical attendance, quarters, medicine, burial, etc. From this circular the following handy reference list for the use of vessel masters is made up. It shows simply the name of hospital, physician or nurse to be applied to at the various ports:

Albany, N. Y.—Albany Hospital.
 Apalachicola, Fla.—Dr. J. D. Rush.
 Ashland, Wis.—Dodd's Hospital.
 Ashtabula, O.—Acting assistant surgeon; quarters by Mrs. Henry Whelpley.
 Astoria, Ore.—St. Mary's Hospital.
 Baltimore, Md.—United States Marine Hospital.
 Bangor, Me.—Acting assistant surgeon; quarters by Helen M. Stratton.
 Bath, Me.—Acting assistant surgeon.
 Beaufort, N. C.—Acting assistant surgeon; quarters by Chas. L. Duncan.
 Bismarck, N. Dak.—Acting assistant surgeon; Lamborne Hospital.
 Boothbay Harbor, Me.—Acting assistant surgeon; quarters by Mrs. Wallin F. Lloyd.
 Boston, Mass.—United States Marine Hospital.
 Bridgeport, Conn.—Bridgeport Hospital.
 Brownsville, Tex.—Acting assistant surgeon.
 Brunswick, Ga.—Acting assistant surgeon; quarters by Johanna Foley.
 Buffalo, N. Y.—Buffalo Hospital (Sisters of Charity).
 Burlington, Iowa.—Mercy Hospital.
 Burlington, Vt.—Acting assistant surgeon.
 Cairo, Ill.—United States Marine Hospital.
 Cambridge, Md.—United Charities Hospital.
 Charleston, S. C.—St. Francis Xavier's Infirmary.
 Chattanooga, Tenn.—Hamilton County Hospital.
 Chicago, Ill.—United States Marine Hospital.
 Cincinnati, O.—United States Marine Hospital.
 Cleveland, O.—United States Marine Hospital.
 Corpus Christi, Tex.—Acting assistant surgeon; quarters by Nieves Verain.
 Crisfield, Md.—Acting assistant surgeon.
 Darien, Ga.—Acting assistant surgeon.
 Delaware Breakwater, Del.—United States Marine Hospital.
 Detroit, Mich.—United States Marine Hospital.
 Dubuque, Iowa.—St. Joseph's Mercy Hospital.
 Duluth, Minn.—St. Luke's Hospital Association.
 Dutch Harbor, Alaska.—United States Marine Hospital.
 Edenton, N. C.—Dr. Richard Dillard.
 Edgartown, Mass.—Patients to be sent to United States Marine Hospital at Vineyard Haven, Mass.
 Elizabeth City, N. C.—Acting assistant surgeon.
 Ellsworth, Me.—Acting assistant surgeon.
 Erie, Pa.—Hamot Hospital Association.
 Escanaba, Mich.—Delta County Hospital.
 Eureka, Cal.—Acting assistant surgeon; quarters by Maria Anderson.
 Evansville, Ind.—United States Marine Hospital.
 Fernandina, Fla.—Acting assistant surgeon; quarters by A. G. Webster.
 Fredericksburg, Va.—Acting assistant surgeon; quarters by Amelia Parrott.
 Gallipolis, O.—Acting assistant surgeon; quarters by Harriet J. Kinder.
 Galveston, Tex.—St. Mary's Infirmary.
 Georgetown, S. C.—Acting assistant surgeon; quarters by R. C. Griggs.
 Gloucester, Mass.—Addison Gilbert Hospital.
 Grand Haven, Mich.—Acting assistant surgeon; quarters by Anna Farnham.
 Green Bay, Wis.—Acting assistant surgeon; quarters by Ellen H. Hume.
 Hartford, Conn.—Hartford Hospital.
 Honolulu, H. I.—Queen's Hospital.
 Hoquiam, Wash.—St. David's Hospital.
 Houghton, Mich.—St. Joseph's Hospital.
 Jacksonville, Fla.—Acting assistant surgeon; quarters by Eugenie Barr.
 Juneau, Alaska.—St. Ann's Hospital.
 Key West, Fla.—United States Marine Hospital.
 La Crosse, Wis.—La Crosse Hospital Association.
 Little Rock, Ark.—St. Vincent's Infirmary.
 Los Angeles, Cal.—Los Angeles Infirmary.
 Louisville, Ky.—United States Marine Hospital.
 Ludington, Mich.—Acting assistant surgeon; quarters by Mrs. H. D. Linsley.
 Machias, Me.—Acting assistant surgeon; quarters by Mrs. A. A. Hill.
 Manitowoc, Wis.—Holy Family Hospital.
 Manistee, Mich.—Mercy Hospital.
 Marquette, Mich.—St. Mary's Hospital.
 Marshfield, Ore.—Acting assistant surgeon; quarters by John Snyder.
 Memphis, Tenn.—United States Marine Hospital.
 Menominee, Mich.—St. Joseph's Hospital.
 Milwaukee, Wis.—St. Mary's Hospital.
 Mobile, Ala.—United States Marine Hospital.
 Nashville, Tenn.—City Hospital.
 Natchez, Miss.—Acting assistant surgeon.
 New Bedford, Mass.—Acting assistant surgeon.
 Newburn, N. C.—Acting assistant surgeon; quarters by Laura D. Eastwood.
 New Haven, Conn.—General Hospital Society of Connecticut.
 New London, Conn.—Memorial Hospital Association.
 New Orleans, La.—United States Marine Hospital.
 Newport, Ark.—Acting assistant surgeon; quarters by H. D. Terrell.
 Newport, R. I.—Newport Hospital.

Newport News, Va.—Acting assistant surgeon.
 New York, N. Y.—Marine Hospital.
 Norfolk, Va.—St. Vincent's Hospital.
 Ogdensburg, N. Y.—Ogdensburg City Hospital.
 Oswego, N. Y.—Ogdensburg City Hospital.
 Paducah, Ky.—Acting assistant surgeon.
 Pensacola, Fla.—Acting assistant surgeon; quarters by Anderson & Crowell.
 Philadelphia, Pa.—German Hospital of the City of Philadelphia.
 Pittsburgh, Pa.—Mercy Hospital.
 Ponce, P. R.—United States Military Hospital.
 Port Huron, Mich.—Acting assistant surgeon.
 Portland, Me.—United States Marine Hospital.
 Portland, Ore.—St. Vincent's Hospital.
 Portsmouth, N. H.—Cottage Hospital.
 Port Tampa, Fla.—Acting assistant surgeon; quarters by A. B. Altree.
 Port Townsend, Wash.—United States Marine Hospital.
 Providence, R. I.—Acting assistant surgeon; quarters by J. L. Bassett.
 Richmond, Va.—"Retreat for the Sick" Hospital.
 Rockland, Me.—Acting assistant surgeon.
 Saginaw, Mich.—St. Mary's Hospital.
 St. Louis, Mo.—United States Marine Hospital.
 St. Paul, Minn.—St. Joseph's Hospital.
 San Diego, Cal.—St. Joseph's Hospital.
 Sandusky, O.—Acting assistant surgeon.
 San Francisco, Cal.—United States Marine Hospital.
 San Juan, P. R.—United States Military Hospital.
 Sault Ste. Marie, Mich.—Sault (Mich.) General Hospital.
 Savannah, Ga.—St. Joseph's Hospital.
 Seattle, Wash.—Seattle General Hospital.
 Shreveport, La.—Acting assistant surgeon; quarters by T. E. Schumpert.
 Solomons, Md.—Acting assistant surgeon; quarters by J. E. Hawkins.
 Sturgeon Bay, Wis.—Acting assistant surgeon; quarters by Mrs. Jane Waters.
 Superior, Wis.—Acting assistant surgeon; quarters by Belle Rosser.
 Tacoma, Wash.—Acting assistant surgeon; quarters by Fannie C. Paddock.
 Tappahannock, Va.—Dr. W. B. Robinson.
 Toledo, O.—Toledo Hospital.
 Vicksburg, Miss.—State Charity Hospital.
 Vineyard Haven, Mass.—United States Marine Hospital.
 Washington, D. C.—Providence Hospital.
 Wheeling, W. Va.—Wheeling Hospital.
 Wilmington, N. C.—United States Marine Hospital.

SALES OF TOWING MACHINES.

Sales of Shaw & Spiegel steam towing machines made since Jan. 1 last by the American Ship Windlass Co., Providence, R. I., are as follows:
 No. 4 machine for barge Alexander Maitland, built by the Buffalo Dry Dock Co. for the Calumet Transportation Co. (D. R. Hanna and others, Cleveland.)
 No. 5 machine for tug Tatoosh, owned by the Puget Sound Tugboat Co., Seattle, Wash.
 No. 2 machine for steamer J. M. Guffey, owned by the J. M. Guffey Petroleum Co., Pittsburg, and built by the New York Ship Building Co., Camden, N. J.
 No. 3 machine for steamer Wallula, owned by the Oregon Railway & Navigation Co., Portland, Ore.
 Four No. 5 machines for vessels building for the Standard Oil Co. of New York.
 Two No. 4 machines for vessels building for the Standard Oil Co. of New York.
 Two No. 1 machines for Russia.
 No. 0 machine for steamer Sandy Hook, Benj. L. Cowles, Buffalo.
 Two No. 3 machines for Montreal Transportation Co., Kingston, Ont., for steamers Rosemont and Bannockburn.

The Industrial Works, Bay City, Mich., one of the largest manufacturers of railroad wrecking cranes in the world, will shortly install a large amount of additional electrical apparatus for the operation of its shops. A recent purchase from the Westinghouse Electric & Mfg. Co. includes a 150 K.W., direct-current generator, which will be used to furnish current to eighteen or twenty direct-current motors already in use in the plant, a 200 K.W., two-phase alternator, and a number of induction motors. The alternating current apparatus will be used entirely for power distribution. In addition to wrecking cranes the Industrial Works also manufacture smaller cranes and transfer tables.

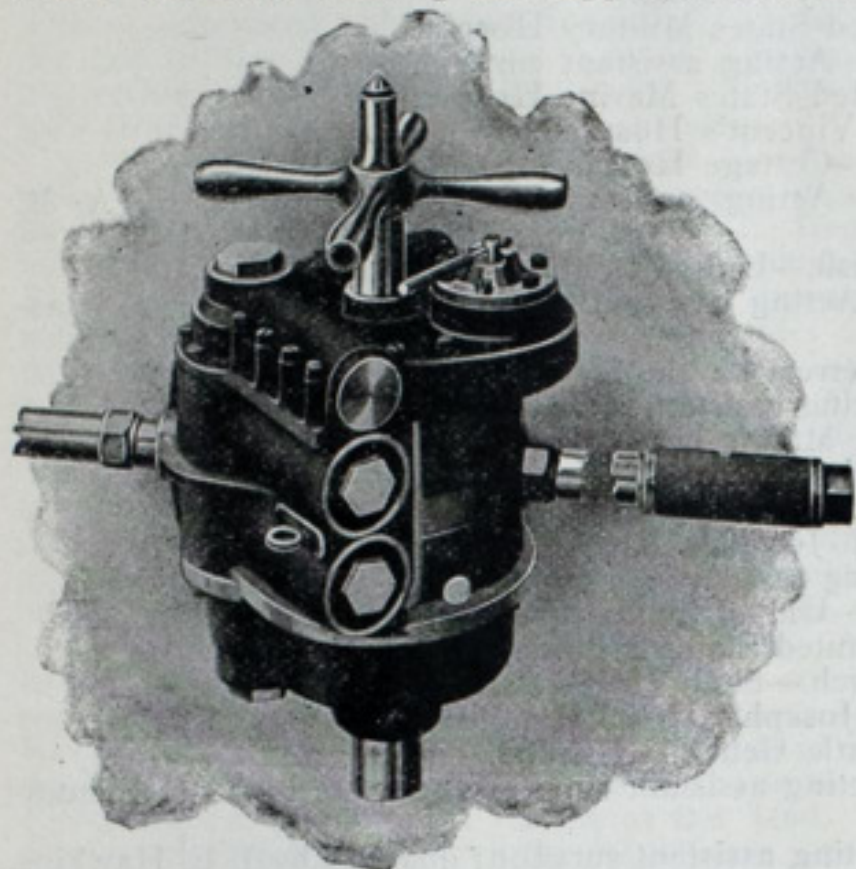
Mr. G. P. Altenberg, foreign manager of the J. A. Fay & Egan Co. of Nos. 325 to 345 West Front street, Cincinnati, O., the large makers of wood-working machinery, has just left on his annual trip for Europe. Mr. Altenberg will also go to South Africa, where he will organize agencies and representatives. The termination of hostilities there has opened up a fine market for the products of the Fay & Egan company, and with their usual activity they are losing no time in taking advantage of this opportunity to introduce their wood-working machines. The address of Mr. Altenberg while in Europe will be 51 Wharton Road, Kensington, London, W., England.

Mr. John R. Buchan of New York has sold to Mr. F. H. Davol, also of New York, his sloop Rondinella. The Rondinella is one of the several boats built by Stearns of Marblehead in 1900 and is known in eastern waters as one of the finest and most desirable boats of her class afloat. The sale was negotiated through the New York office of Frank N. Tandy, 52 Broadway.

Eight mechanical stokers of the kind made by the Duluth Stoker Co., Duluth, Minn., and which are in use on several large lake freight steamers, have been purchased by the Eastern Ship Building Co., New London, Conn., and will be installed in the first of the big Hill Pacific liners building at New London.

REVERSIBLE DRILL.

We illustrate herewith a new reversible drill of the "Little Giant" type recently developed and put upon the market by the Chicago Pneumatic Tool Co. This machine was primarily designed to meet the want of customers who required a drill for general use, but whose work is not sufficiently specialized to warrant the purchase of any one of the "Little Giant" exclusive reaming and tapping machines. The motor is of the



same general construction as all of the new "Little Giant" drills, the distinguishing feature of which are four single acting pistons coupled to one crank shaft at an angle of 90°, each piston of each pair traveling in opposite directions, at all time insuring a well-balanced and durable engine. All moving parts are in an oil-tight case and each pair of cylinders is controlled by one balanced piston slide valve. There has been added a simple reverse valve of the same construction as in the Nos. 11 and 12 machines, but so situated that it does not inter-

fere with the feed screw when the machine is used as a simple drilling machine. The controlling lever may be removed from the motor when not required as a reversible machine. It can then be controlled with the ordinary throttle, which is situated at the side of machine as in the plain drills. The reverse valve can be used as a throttle valve, however, when very rapid and accurate reverse motion is required, as would be the case when the motor is used in connection with the machine for setting locomotive slide valves or tapping to a given point, or to bottom, and various other applications which will readily suggest themselves to the mechanic requiring a machine of this kind.

Some of the improvements that will be appreciated by mechanics who have used these drills are as follows: All bearings are furnished with removable bushings; the crank journals have been increased by 50 per cent.; the crank pinion is now shrouded on both ends, which will prevent teeth from breaking; the upper and lower bearings for crank shaft are bronze; sleeves of ball-and-socket form easily removed (no screws required to hold them in place), which form of bearing insures perfect alignment always and consequent increase in speed and power; hardened steel eccentric straps connect valves to crank shaft in place of bronze used formerly; oil plugs have been dispensed with; oil is poured in through handle, and, as it is impossible to use the drill without this handle, and nothing but the handle will fit the hole, it will surely be replaced, even by the most careless workman, insuring long life to working parts; a leather-packed stuffing box is supplied to keep oil from escaping; every moving part is hardened and ground to fit.

SMOOTH-ON IRON CEMENT

IS A POWDERED-METALLIC-COMPOSITION

which, upon being mixed with water, becomes a hard metallic **IRON**, that is insoluble in water, steam or oil, withstands fire and expansion and contraction—being the same as iron is why it is sometimes called **MAGIC IRON**.

When applied to a blemish in a casting the blemish is removed. Hundreds of breaks or fractures in hydraulic machinery, leaks in connections in steam or water work, have been permanently and cheaply repaired with **SMOOTH-ON**.

Send for 60 page illustrated book. It is free.

SMOOTH-ON MFG. CO., 572-574 Communipaw Ave.,
JERSEY CITY, N. J.

TESTING TORPEDO BOAT DESTROYERS.

In order to test the strength of torpedo boat destroyers the British admiralty has ordered a remarkable experiment to be made at the Portsmouth dock yard. One of the dry docks is being especially prepared for the destroyer *Wolf*, where she will be subjected to a series of tests which will include hogging and sagging strains. At first she will be sagged by being hung by the head and stern from two platforms having no support beneath. The middle will then be hogged—that is she will be balanced across a pile of timber so that the full strain of the unsupported fore-and-aft parts will be thrown on the center of the vessel. The experiments will prove whether a destroyer's hull is so weak, as was suggested in the case of the *Cobra*, that the back breaks when a wave lifts her amidships or a sea lifts her in such a manner that the wave is hollow beneath her middle.

Cabins and ..Staterooms

of modern vessels especially those in the passenger service should demonstrate the supreme possibilities of the wood finisher's art.

This demands a special varnish however, as atmospheric conditions are more destructive to varnish afloat than ashore and the ordinary article is of but little use.

The varnish best adapted to withstand the deleterious influences of wind, wave and weather is "**BERRY BROTHERS' SPAR VARNISH.**"

Further particulars and a unique marine puzzle sent free for the asking. Write us.

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MANUFACTURERS OF
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THE LATEST AND BEST
STOCKLESS ANCHOR.
APPROVED BY LLOYD'S.

ANCHORS CAST AND TESTED ON
ORDER, OR STOCK ORDERS
PROMPTLY FILLED.

A GUARANTEE OF QUALITY.

OPEN-HEARTH STEEL CASTINGS
OF THE HIGHEST GRADE.
FACILITIES FOR CASTINGS UP TO
80,000 POUNDS WEIGHT.

MACHINE WORK AND PATTERNS
FURNISHED WHEN REQUIRED.

RAIL OR WATER DELIVERIES.

CAPACITY, 1500 TONS PER MONTH

Seaboard Steel Casting Co.,

CHESTER, PA.

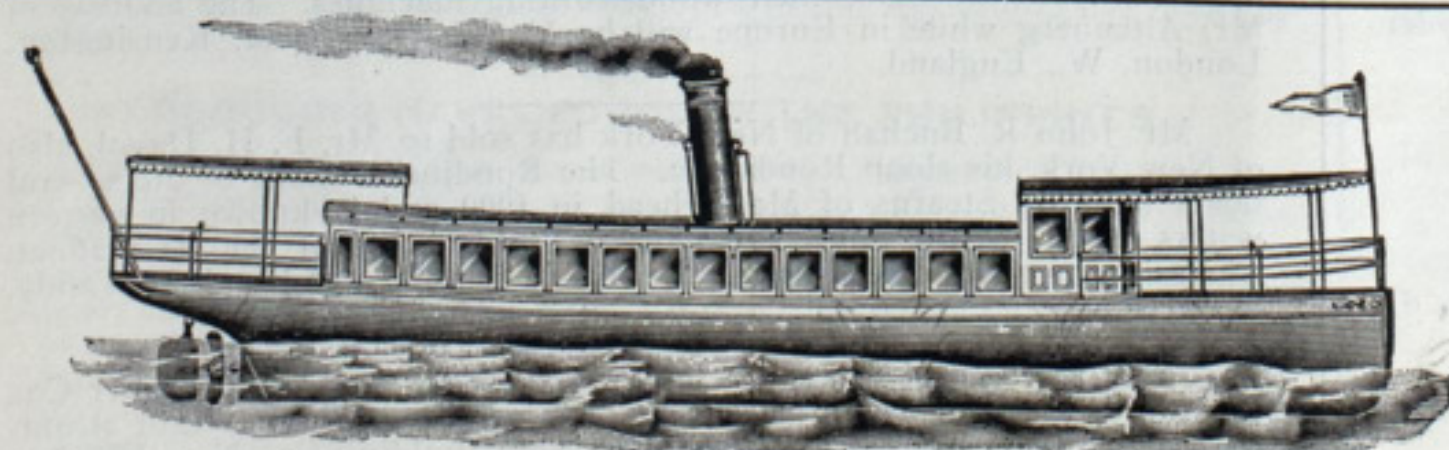
TO BOAT BUILDERS.

Our exclusive specialty is designing and building (to order) complete outfits of genuine **MARINE** machinery in small and medium sizes (4 to 30 inch cylinders).

HIGH PRESSURE—COMPOUND—TRIPLE EXPANSION
and **PADDLE WHEEL** OUTFITS.

EITHER WOOD OR COAL-BURNING MARINE BOILERS.

CATALOGUE FREE.



MARINE IRON WORKS,

Station A, CHICAGO, ILL.

The Only Marine Directory

The Marine Review publishes annually the Blue Book of American Shipping

THE ONLY MARINE DIRECTORY IN THE UNITED STATES



THIS directory is now in its seventh year and has increased steadily in patronage and in strength. Every bit of statistical information of a maritime character which is collected during the year in this office finds its way into the Blue Book.

Every ship builder, marine engine and boiler builder, ship owner, naval architect, marine engineer, and, in fact, everyone whose business is with ships is mentioned in the Blue Book and his address given. The aim has been to make it a complete working directory of the marine trade of the United States. With its aid you may reach anyone connected with this great branch of industry.

Its statistics of waterborne commerce are thoroughly reliable. The section devoted to the commerce of the great lakes with its iron mines and their output, its coal trade and dock facilities, its grain trade and elevators, its ships and their owners, is very thorough and absolutely authentic.

The rear pages of the Blue Book are devoted to a **BUYERS' DIRECTORY** of the **MARINE TRADE**—that is a list of manufacturers of ship yard equipment and ship supplies, arranged under the titles of the articles which they make, for the benefit of the buyer, who is usually the ship builder or ship owner. By ordering a copy of the Blue Book in advance your name will be inserted in the Buyers' Directory under various headings suited to your business without extra charge. The price of the Blue Book is \$5.

If you decide to advertise your output in the Blue Book your name will, of course, be inserted under the various headings of your business and you will receive a copy of the book free. The advertising rates are extremely low—full pages \$75 and \$100, and half pages \$40 and \$55, according to location.

The Blue Book enjoys an extended patronage throughout the United States and Canada and a considerable favor in Great Britain and Europe. We, therefore, commend it as a medium where-with to reach the foreign field.

The Blue Book is now in preparation for the press and will be published within three weeks. If you would like to know more about it, a postal card will fetch a little booklet.

MARINE REVIEW PUBLISHING CO.

39-40-41 Wade Bldg., Cleveland, Ohio

SINGLE CYLINDER PLANER.

A new and improved planing machine with single cylinder is illustrated herewith. Planing and smoothing machines are most successful among the specialties turned out by the makers of this tool, and this is one of the latest and best. It is a machine for general work. It was patented Dec. 19, 1899, and Feb. 6, 1900. Attention is directed by the manufacturers to these features:

1. Planes 24, 27 and 30 in. wide and 6 in. thick. Feed is driven from cylinders; is powerful, steady and uniform, and under instant con-

ently raises and lowers for variation in thickness of work. This arrangement allows of the working of stock varying $\frac{1}{4}$ in. in thickness.

3. Four powerfully-driven feed rolls, upper feeding-out one raising parallel for different thicknesses. Rolls have sectional weights, insuring at all times perfect pressure on material.

4. Bar before cut is sectional, to correspond with feeding-in roll; bar after cut is adjustable by hand wheel. Bed is substantial, and easily raises and lowers. Cylinder is of improved construction for assuring smooth and even work. All adjustments easily, quickly and accurately made.

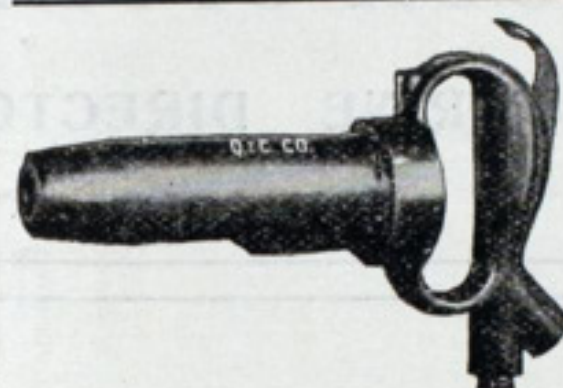
Further particulars, descriptive matter and terms, will be sent upon application to the makers, J. A. Fay & Egan Co., Nos. 325 to 345 West Front street, Cincinnati, Ohio, who will also send free their new and complete catalogue of wood working machinery.

Sand Sucker For Sale.

Steam barge of about 165 tons capacity. Built in 1901, equipped with 8-in. sand pump and complete outfit for sand sucking. Running expenses very light. Price \$8,000. Address 316 Russell street, Detroit Mich. July 31.

Excursion Steamer For Sale.

Excursion steamer 87 ft. long, 18 ft. 6 in. beam and 7 ft. hold. Allowed 200 passengers. Double deck. Engine steeple compound, 11½ and 20 by 16 in. Boiler allowed 100 lbs. steam. Everything in first-class condition. Now running on route. Very economical on fuel. Capt. F. R. McGregor, 424 Claremont avenue, Chicago. July 31.

**PNEUMATIC TOOLS**

Q & C

HAMMERS
HAND RIVETERS
YOKE RIVETERS
DRILLS
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ALL KINDS OF PNEUMATIC TOOLS FOR SHIP YARD MACHINE SHOPS.

METAL SAWING MACHINERY.

The Q & C Co., Western Union Bldg., CHICAGO
114 Liberty St., NEW YORK.

trol of friction clutch convenient to operator. Rate of feed is furnished as desired.

2. Patent sectional feeding-in roll in four sections, with each section center-geared and gear driving downward. Each section independ-

BELLEVILLE GENERATORS

Grand Prix 1889
Originated 1849

Hors Concours 1900
Latest Patents 1902

Number of Nautical Miles made each year by Steamships of the Messageries Maritimes Co., Provided with Belleville Generators—Since their Adoption in the Service.

Year.	Australien	Polynésien	Armand Béhic	Ville de la Ciotat	Ernest Simons	Chili	Cordillère	Laos	Indus	Tonkin	Annam	Atlantique
1890.....	67,728	2,460										
1891.....	68,247	68,331	204									
1892.....	68,247	68,403	69,822	23,259								
1893.....	68,379	68,343	68,286	68,247								
1894.....	68,439	68,367	68,574	68,439	37,701							
1895.....	68,673	68,766	68,739	68,808	40,887	28,713						
1896.....	69,534	92,718	69,696	69,549	62,205	63,153	40,716					
1897.....	68,250	69,606	92,736	69,555	62,235	76,110	63,357	43,146				
1898.....	70,938	69,534	69,552	69,597	62,526	63,240	63,240	62,553	63,954	22,707		
1899.....	69,534	69,615	67,431	90,405	60,246	62,778	62,868	52,344	54,855	44,007	22,884	
1900.....	69,534	67,494	69,744	69,564	61,719	62,382	62,502	51,471	53,373	62,016	63,066	52,140
1901.....	44,220	69,627	69,594	66,948	51,057	62,460	62,490	61,743	62,688	43,866	62,466	63,126
Total.....	801,723	783,264	714,378	664,371	438,576	418,836	355,173	271,257	234,870	172,596	148,416	115,266

ATELIERS ET CHANTIERS DE L'ERMITAGE, À ST. DENIS (SEINE), FRANCE.

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